

# PYROT®

## Assembly and Installation Instructions KRT 100 to KRT 540



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Viessmann Group

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# **1 General Information**

Köb solid-fuel furnaces may only be set up and commissioned by specialists. This will rule out any incorrect assembly or commissioning. These instructions have thus been reduced to important technical data, references to regulations, technical rules and other regulations.

## **1.1 State of the art**

The operating instructions are in keeping with the PYROT at the time of its delivery. In the interest of our customers, we reserve the right to make subsequent alterations resulting from further technical development without being required to give notification of such.

## **1.2 Documented information**

The installation instructions contain the information required according to the EC Machinery Directive, 98/37/EEC, Appendix 1, Number 1.7.4.

**Issue: 2008-10\_english**

# **2 Important Instructions**

## **2.1 Safety instructions**

The water-bearing and electrical installation as well as the chimney connection must be carried out by individuals authorised to do so, complying with all relevant standards and safety regulations.

## **2.2 Permits by public authorities**

The PYROT is a heat generator in Boiler Category 3 for heating systems with hot water with a safety temperature of 110°C and has been tested and approved in accordance with European Standard EN 303-5: 1999 (heating boilers for solid fuels, manually and automatically loaded firing systems). The PYROT also meets all European national differences based on tightened regulations regarding emission levels and efficiencies:

### **Austria:**

Art. 15a B-VG

"Agreement on the Saving of Energy"

"Agreement on Protective Measures concerning Small-scale Furnaces"

Federal Law Gazette

331<sup>st</sup> Act

Furnaces Act

FAV dated 18.11.1997 Part II

### **Germany:**

German Federal Emissions Control Act

"Small-scale Furnace Systems Act, 1<sup>st</sup> BImSchV", dated 1997-03-14

### **Switzerland:**

Air-pollution Control Act, *LRV*, dated 16 Dec 1985, incl. the amendment dated 20 Nov 1991

### **Netherlands:**

*NeR*

Dutch Directive on the Incineration of Clean Remnant Wood, June 1995

**The installation of the PYROT rotary combustion chamber boiler must be approved by the local building authority and registered there.**

## **2.3 Standards and regulations**

- Hot-water heating systems: Safety Equipment DIN 4751 ÖNORM B 8130, ÖNORM B 8131
- Indoor chimneys: Requirements, Planning and Execution, DIN 18160
- Chimney Dimensioning, DIN 4705 ÖNORM M7515
- Heating water: Preventing Damage by Corrosion and Scale Formation in Hot Water Heating Systems, VDI 2035
- Storage of non-pelletised wood fuels: Pressure Relief of Dust Explosions, VDI 3673 SUVA, Swiss Accident Insurance Association Guideline No: 1875, Wood Shavings Silos SUVA Technical Rules No: 66050 Green Woodchip Silos
- Fire protection Automatic Wood-burning Systems, TRVB H118, Issue 1997 Wood-burning on Steam Boilers, TRD 414, Version of August 1996
- Supplementary air devices for indoor chimneys, DIN 4795

**The regulations applicable to the respective location of installation must always be complied with.**

On request, we will be glad to provide you with the sources referred to for the standards and regulations listed. When on stock, we will be glad to send such to you at cost price.

### **3 The structural Surroundings for the Furnace**

**The national building regulations existing in this connection must always be complied with.**

#### **3.1 Heating room requirements**

A separate and dry heating room must always be provided for the PYROT. No combustible materials may be stored in the heating room. The heating boiler may only be set up on a fire- and temperature-resistant floor. No temperature-sensitive pipes or installation lines may be installed in the floor below the heating boiler.

The load-bearing capacity of the heating room floor must be designed for the weight of the system plus filling with water and fuel. The load-bearing capacity of the floor in the area of the boiler bearing surface must be 2000kg/m<sup>2</sup>. Detailed technical dimensioning is possible with data sheet no. 6010.

The minimum distance to the walls and ceiling required according to the table of dimensions for proper cleaning and maintenance of the boiler must be complied with. A sufficient supply of fresh air must be provided directly from outdoors into the heating room. Induced ventilation is necessary for heating rooms that are confined or enclosed. The temperature in the heating room must not exceed +40°C while the system is in operation (in the area approx. 1 m away from the boiler). The temperature in the heating room must not fall below +10°C while the system is in operation (inner side of exterior walls).

#### **3.2 The chimney connection**

The PYROT rotary combustion chamber boiler is equipped with an exhaust fan and thus a fireplace without a draught requirement.

The design of the chimney should be carried out as for a fireplace with an oil or gas blast burner without a draught requirement (exhaust temperature at rated load of 160°C-200°C).

The PYROT rotary combustion chamber boiler is output-controlled within a range from 30%-100% of the rated boiler output. This produces exhaust temperatures within a range from min. 100°C and max. 250°C. An insulated chimney should be provided to prevent the danger of sooting.

The distance from the exhaust fan to the chimney should be as short as possible. 90°-elbows should be avoided if possible. Exhaust gas lines of more than 1 m in length must be insulated.

The connection to the chimney should be made such that it rises at an angle from 30°-45°. The exhaust line, incl. the lead-in into the chimney, should be executed so as to be gas-tight.

**A supplementary air device (draught controller) is absolutely necessary in the chimney to provide for intended operation of the PYROT Rotation Heating System.**

### **4 Transport and Installation**

**The personnel who carry out the transport have to know the dangers of accidents that might arise on doing so and prevent such through suitable measures.**

**Only hoist the boiler when it is entirely empty (of water, fuel and ash).**

**Pyrot 100 - 300**

**Hoist by the lifting lug.**

**Pyrot 400 - 540**

**Hoist by forward-flow and return-flow connection pieces using a cross bar.**

## **5 Water System Installation**

Customers must ensure that there is a supply of water independent of the electricity supply. This (redundant) design ensures that in case of a power failure, the boiler will be reliably cooled by the thermal run-off safety valve.

**Refer furthermore to the standards and regulations listed in this document.**

### **5.1 Safety Equipment**

The safety equipment for the heating installation must be carried out by the heating engineer authorised to do so.

See Spec Sheet 5960 as an example.

### **5.2 Expansion**

With closed expansion, the supply pressure to the expansion tank should be equal to the max. amount of the facility plus 0.2 bar.

### **5.3 The boiler circuit with return circuit valve**

To reliably prevent boiler corrosion through condensation of the exhaust gases, the boiler return flow temperature must in no case be below 65°C.

The PYROT rotary combustion chamber boiler is infinitely variably output-controlled. For this, it is necessary for there to be a constant flow through the boiler of the water to be heated. The boiler circuit with the boiler pump and boiler mixer must therefore be installed according to Spec Sheet 5960.

The design of the boiler circuit should be carried out such that the temperature difference between the forward flow and the return flow is equal to or less than 15°C.

The triggering of the boiler pump and boiler control valve is integrated in the control system that comes with the facility.

### **5.4 The extinguishing water tank**

A self-triggering extinguishing device must always be installed by the furnace feed system. With regard to the assembly, refer to the spec sheets in the annex.

The functioning is carried out by means of an extinguishing valve and is not dependent on electric current. A float-type switch monitors the water level and should be electrically connected (see connection diagram).

## **6 Electrical Installation**

### **6.1 Positioning the control module and control cabinet**

The control module should be mounted by the installing electrical installation company at a spot easily accessible for operation. Optimum positioning of the control cabinet will allow minimisation of the length of installation lines and thus of costs.

The position of the control module and control cabinet should be selected such that the negative effect of heat radiation (front side of boiler, rear side of boiler with exhaust gas collector and exhaust gas fan as well as exhaust gas line) and interference caused by dust during cleaning will both be kept as low as possible.

The ambient temperature for the control cabinet (approx. 10 cm away from the control cabinet) should not exceed 40°C while the system is in operation. In case of doubt, preference should be given to placing the control cabinet outside the heating room near the heating room door.

### **6.2 Electrical connection**

- Connect it according to the wiring plan, laying of the CAN-BUS wire according to data sheet 4020.
- In the area of hot parts (exhaust gas fan, exhaust gas pipe), the lines should be installed in steel pipes at an appropriate distance so as to be temperature-protected.
- The cable bushings to the motors and equipment must be executed so as to be dust-tight and provided with a strain relief.

**The regulations of the local electrical utility company must be complied with.**

## 7 Fire Protection

The fire protection regulations for wood heating systems differ from country to country.

**The regulations applicable to the respective location of installation must always be complied with.**

### 7.1 Protection against burn-back for the boiler plant

These are part of the scope of delivery for the PYROT rotary combustion chamber boiler.

#### 7.1.1 Preventing overfilling of the fire box

According to TRVB 118, a level monitor must be installed to prevent overfilling of the fire box. The PYROT rotary combustion chamber boiler has two light barrier to monitor the embers.

#### 7.1.2 Preventing burn-back

With a sensor directly on the insertion pipe, any danger of burn-back beginning will be detected and quickly counteracted at an early stage through boosted output (an increase in the advancing of the material).

As a result, any requirement for a protective device coming into effect is avoided, and normal operation, defined as the greatest possible degree of safety supplying heat, is adhered to.

#### 7.1.3 The backflash safeguard (RZS)

According to TRVB 118, a backflash safeguard is required for all facilities over 150 kW.

TRD 414 prescribes a continuously present isolating layer if a spark-alarm and extinguishing system is dispensed with. (TRD 414 refers primarily to remnant wood from the processing of wood and derived timber products.)

For chip materials from the forestry and sawmill sectors, the restrictions are eased in part in this connection.

The PYROT rotary combustion chamber boiler is always equipped with an isolating layer and is continuously operated with negative pressure.

As a result, according to both TRVB 118 and TRD 414, the PYROT rotary combustion chamber boiler is considered as equipped with a backflash safeguard (RZS).

#### 7.1.4 Automatically Triggering Extinguishing System for the Furnace Feed (SLEK)

A water extinguishing system is always necessary on the feed auger.

This system should reliably prevent burn-back in case of a malfunction (such as a power failure). For safety reasons and to prevent damage by flooding, connecting the extinguishing system directly to the water network is not advisable.

This extinguishing system must always be equipped with a 25-l extinguishing water tank with a float-type switch and an adjustable Danfoss extinguisher valve.

According to TRVB 118, the tank for the SLE must be equipped with a level monitoring system.

If there is a shortage of water, the PYROT rotary combustion chamber boiler will switch off automatically. In case of excess temperature, the feed auger will be flooded reliably but in a limited fashion.

**The pipework for the extinguishing system must be carried out by the heating engineer according to Spec Sheet 4550.**

### 7.2 Burn-back safeguard for the fuel supply system (RSE)

The rest of the "burn-back protection for material transport" depends on the respective requirements (location, size of the fuel storage site, material, pressure conditions & regulations), these being separate items for the scope of delivery ordered from KÖB & SCHÄFER GmbH according to the descriptions below.

**We always recommend installing a rotary valve as per section 7.2.3 for the PYROT Rotation Heating System.**

**In addition to being a safeguard against burn-back, this will also prevent any penetration by air leaking in via the feed auger.**

#### 7.2.1 Automatically Triggering System for the Material Supply System (SLE-M)

Approved in part as a variation to the shut-off valve in pressure-less fuel storage units (does not meet TRVB).

**The installation of the extinguishing system must be carried out by the heating engineer according to Spec Sheet 4550.**

#### 7.2.2 The slide valve

This is approved in pressure-less fuel storage units in all cases and applies according to TRVB 118 (test certificate BV 2979/89) as a suitable safeguard against back-burn.

### 7.2.3 Rotary valve

If remnant wood is moved into fuel storage spaces with fans, then, in order to reduce pressure applied, at least one rotary valve is necessary to reduce pressure between the fuel storage unit and the furnace. The rotary valve is suited to reduce pressure and at the same time is considered according to TRVB 118 (test certificate BV 2979/89) as a suitable safeguard against back-burn.

**Max. overpressure allowed in fuel storage unit: +500 Pa**

**Max. negative pressure allowed in fuel storage unit: +0 Pa**

### 7.2.4 Double rotary valve with pressure compensation system

If, due to special circumstances, any mechanically produced negative pressures or extraordinarily high overpressures are expected in the fuel storage unit, then two rotary valves must be installed in the material transport route according to the respective project plan with a pressure compensation line to the outdoors.

**Max. overpressure allowed in fuel storage unit: +3000 Pa**

**Max. negative pressure allowed in fuel storage unit: -3000 Pa**

**One must have the supplier of the chip suctioning system confirm the maximum pressures to be expected.**

The rotary valve below the silo extraction system can become leaky due to wear of the sealing elements or through large pieces of wood that cannot be conveyed. This leakage can make it possible for low-temperature gases to flow back from the furnace into the silo.

A smoke gas alarm must be installed between the rotary valve and the silo extraction system, which, when triggered, will disconnect the system causing the negative pressure for the silo.

## 7.3 Fire protection for the fuel storage space

The measures necessary for this are never part of the scope of performance from KÖB Holzfeuerungen GmbH.

**The conditions set by the local building authorities must be met by the operating organisation in this connection.**

## 8 Commissioning

Only KÖB Holzfeuerungen GmbH or another trained specialist may put a newly installed facility into operation for the first time.

Before the facility is commissioned, the system must be filled with water, fuel stored for the commissioning and the installation inspected.

### 8.1 Filling the heating system

The first filling is usually carried out with untreated water without any chemical water treatment but definitely filtered and thus free of any suspended solids.

Pay special attention when the filling is carried out to be sure the air is carefully bled out. With difficult water conditions (high degrees of hardness, etc) and/or large volumes of water, comply with VDI Guideline 2035 "Preventing Damage through Corrosion and Scale Formation in Hot Water Heating Systems" by using appropriate measures for water treatment.

**Note: The filling pressure of the cold water reserve should be approx. 0.1 bar greater than the supply pressure of the closed expansion tank.**

### 8.2 Fuel for the commissioning

For the commissioning, dry fuel (max. W 20%) should be stored in an amount for approx. 10-24 full operating hours.

This is as follows:

PYROT 100	approx	800 kg
PYROT 150	approx	1200 kg
PYROT 220	approx	1500 kg
PYROT 300	approx	2000 kg
PYROT 400	approx	2500 kg
PYROT 540	approx	3000 kg

Since the boiler plant is cold, and the residual moisture will also be drawn from the refractory concrete during the initial operation, the material to be burned for the initial operation has to be at least air dry. The heating-up process should be carried out during the first three hours at low output.

To check the functioning of the silo extraction system, not too much material to be burned should be stored so as to be able to quickly clear out the extraction system to remedy the cause of any malfunction there might be.



### 8.3 Inspection of the installation

Before the commissioning, the future operating organisation along with the installing companies (heating engineer & electrician) are obliged to inspect the installation for the following points:

1. Exhaust gas port connected to the exhaust gas line on the chimney.
2. Chimney completely installed with clear cross section all the way through.
3. Safety valve installed on the boiler and/or boiler forward flow.
4. Thermal run-off safety valve connected to the cold water network.
5. The sensor for the thermal run-off safety valve is situated in the dipping shell.
6. The sensor for the temperature-limiting safety switch is situated in the dipping shell.
7. The extinguishing water tank on the feed auger is filled with water.
8. The sensor for the extinguisher valve is mounted tight on the pipe for the feed auger.
9. The expansion tank is connected.
10. The conveying systems are installed between the boiler and the material storage unit.
11. The facility is filled with water.
12. Material to be burned is stored for the test operation.
13. The safety limit switch is installed on the door to the material storage site (if there is a walk-through door).
14. The control system is connected to the power supply network.
15. The motors, switches and sensors are electrically connected.

**Do not put the facility into operation over-hastily without the presence of a specialist from KÖB Holzfeuerungen GmbH or another trained specialist.**

**In case of damage, you would lose your warranty claims.**

Inspected on .....

By .....

Signature .....

### 8.4 Commissioning and handover

A competent contact person from the operating organisation's side must be present for the commissioning and handover.

The heat dissipation from the boiler plant has to be assured by the operating organisation or by the heating engineer.

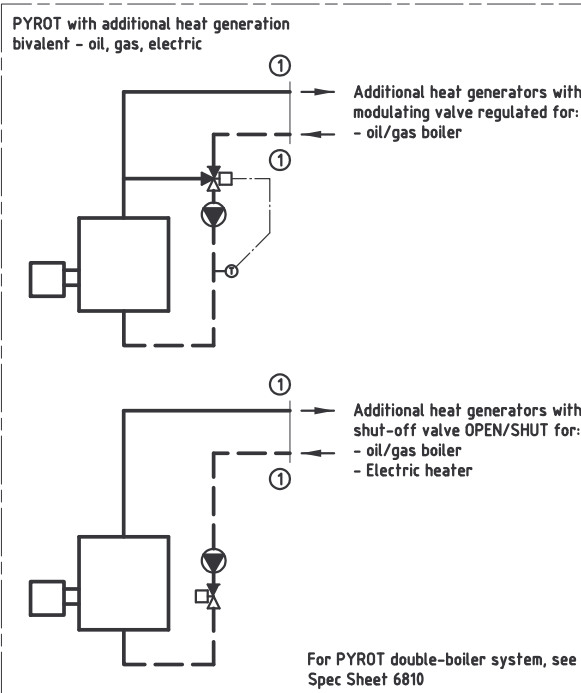
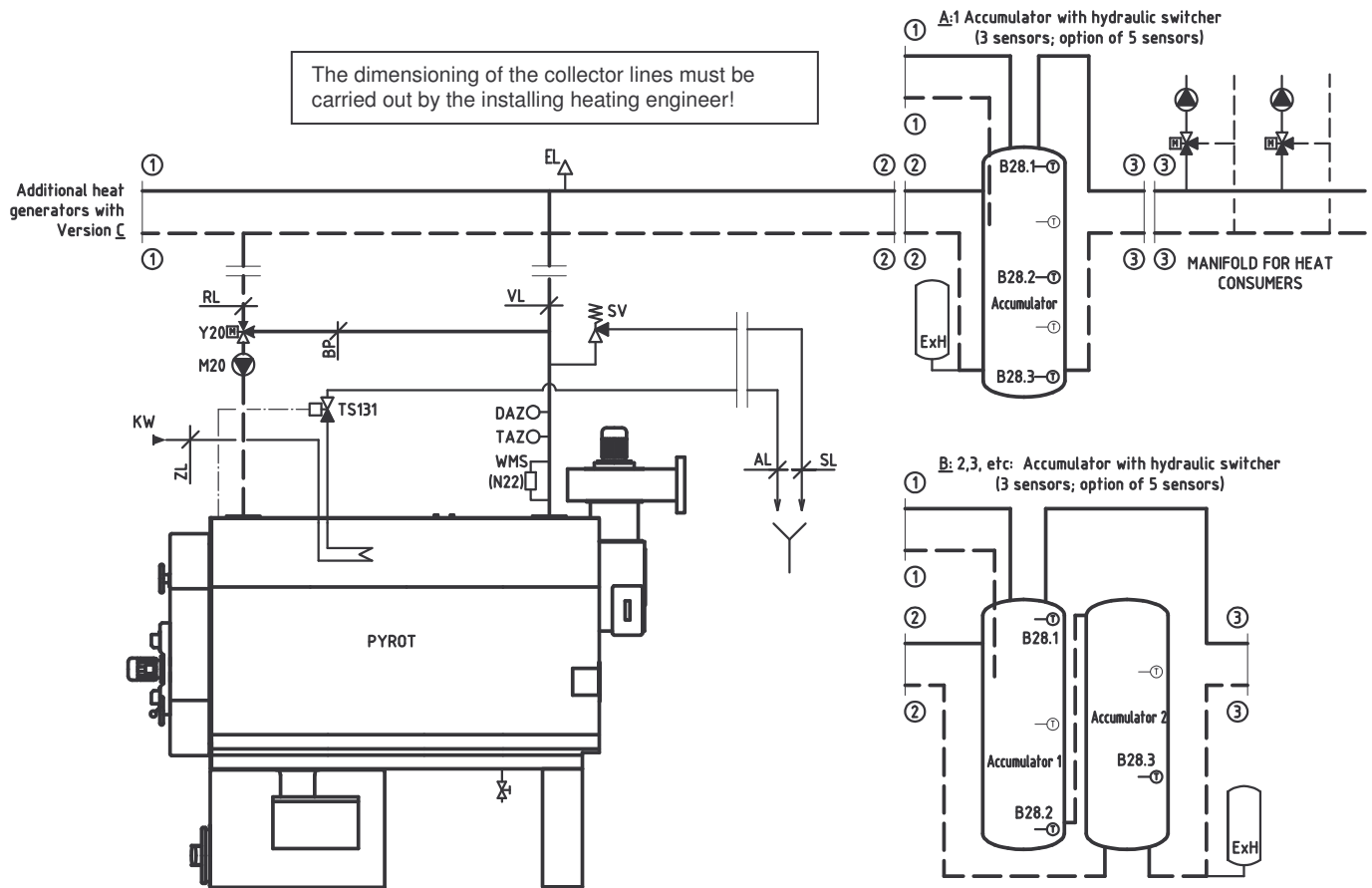
The heating engineer has to confirm that an inspection of the installation has been carried out positively by handing over these signed Installation Instructions.

Complying with these Installation Instructions and also following the Operating Instructions, you will be provided with heat from wood in a safe and convenient fashion.

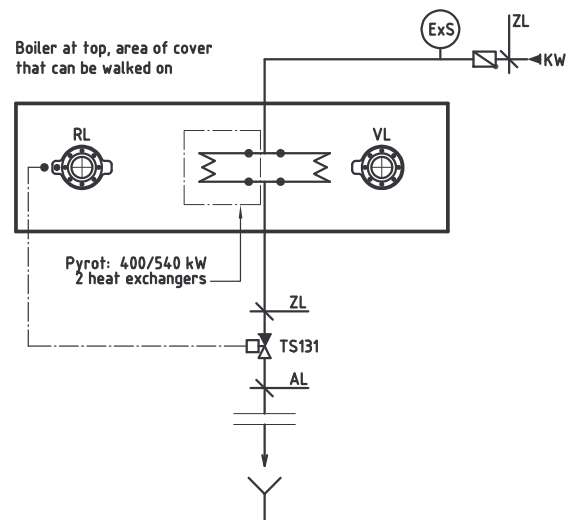
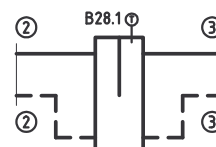
KÖB Holzfeuerungen GmbH thanks you for the trust you have shown in us.

**These Installation Instructions should be kept near the facility on a permanent basis.**

The dimensioning of the collector lines must be carried out by the installing heating engineer!



C: hydraulic switcher is possible with a large volume of water in the network.



a) Note:

- To reliably prevent boiler corrosion caused by condensation of exhaust gases, the boiler return flow temperature must not under any circumstances be below 65 °C. A boiler circuit pump with a boiler mixer should be provided according to the diagram for this purpose. The boiler circuit should be designed such that the temperature difference between the forward flow and the return flow is equal to or less than 15 °C.
- For integrating heat consumers, see Spec Sheet 4000.
- The expansion tank has to be connected to the boiler above the boiler forward flow and without any shut-offs.

**b) Safety-relevant equipment included in the scope of performance provided by the installing heating engineer**

M 20	Boiler pump
Y 20	Boiler mixer
SV	Safety valve, pressure set to max. 3.0 bar, homologated component as per DIN 3440
	Nominal width of the valve, of the connection line and of the exhaust pipe as per DIN 4751 Part 2
TS131	Thermal run-off safety valve R 3/4", homologated component; special-purpose design for opening temperature 100 °C, (safety heat exchanger built into boiler). With the Pyrot-400 and Pyrot-540, two safety heat exchangers in parallel are required but only one thermal run-off safety valve.
KW	Cold water inlet, min. 2.5 bar, max. 3.5 bar
WMS...	Water level control device, homologated component; required in Germany starting from systems over 350 KW, Installation recommendation: WMS with magnetic transmission of the float movement to a switch unit
EL	Air separator (recommendation: absorbtion-type degasser)
ExH...	Expansion tank closed, with design certification; for heating system (Recommendation: connect on cool return flow, connected to the boiler via the forward flow without any blockage units)
ExS...	Expansion tank closed; with design certification; for safety heat exchanger, max. 4.0 litres, 10 bar
DAZ	Pressure indication device (pressure gauge)
TAZ	Temperature indication device (thermometer)

**c) Design recommendation**

Model KPT-	Boiler circuit (VL, RL, BP)	Thermal run-off safety valve TS-131 (quantity)	Water through-put required at 2.5 bar	Accumulator volume <sup>3)</sup>	Supply line ZL	Drain pipe AL <sup>2)</sup>	Safety valve model SV 68M <sup>1)</sup>	Safety line SL <sup>2)</sup>
100	NW 40	1	620 l/h	1500 l	R 3/4"	R 1"	R 1"	NW 32
150	NW 50	1	915 l/h	1500 l	R 3/4"	R 1"	R 1"	NW 40
220	NW 50	1	1230 l/h	2200 l	R 3/4"	R 1"	R 1"	NW 40
300	NW 65	1	1500 l/h	2500 l	R 3/4"	R 1"	R 1 1/4"	NW 50
400	NW 80	1	1880 l/h	3200 l	R 3/4"	R 1"	R 1 1/4"	NW 50
540	NW 80	1	2266 l/h	4300 l	R 3/4"	R 1"	R 1 1/2"	NW 65

<sup>1)</sup> Threaded connection for supply line

<sup>2)</sup> Length of the exhaust pipe up to 4.0 m (for longer lines, see DIN 4751 Part 2)

<sup>3)</sup> On request, we will be glad to provide a project-based offer on the accumulator(s).

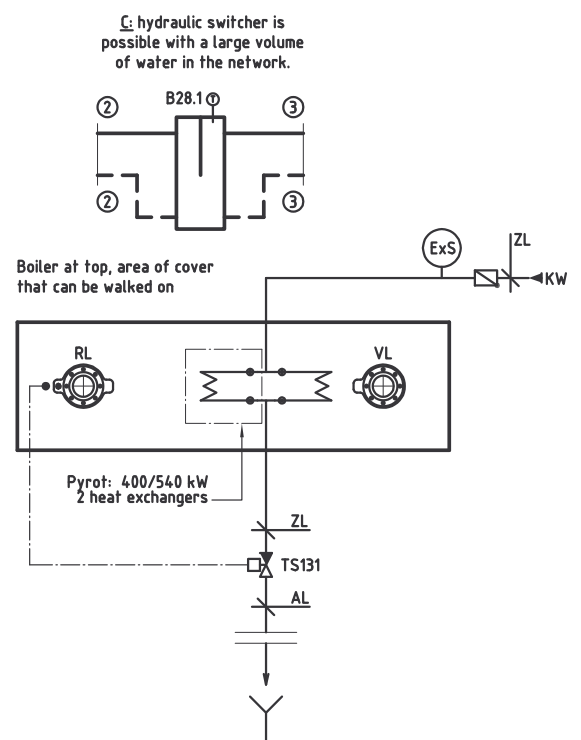
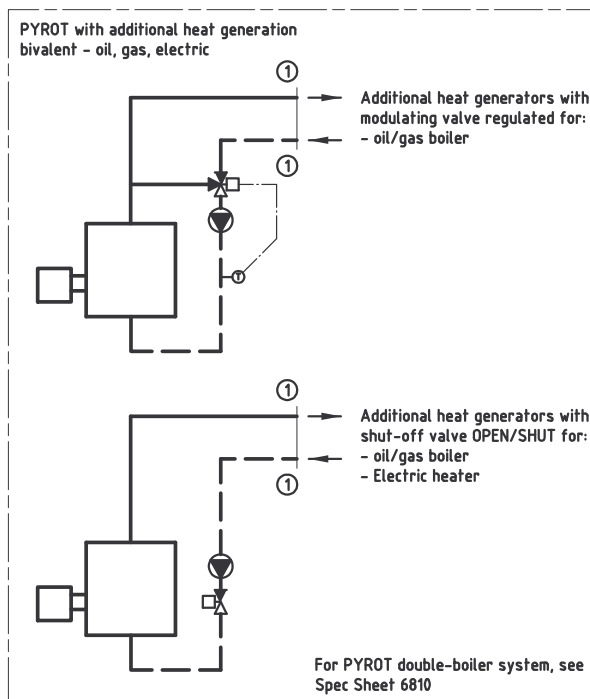
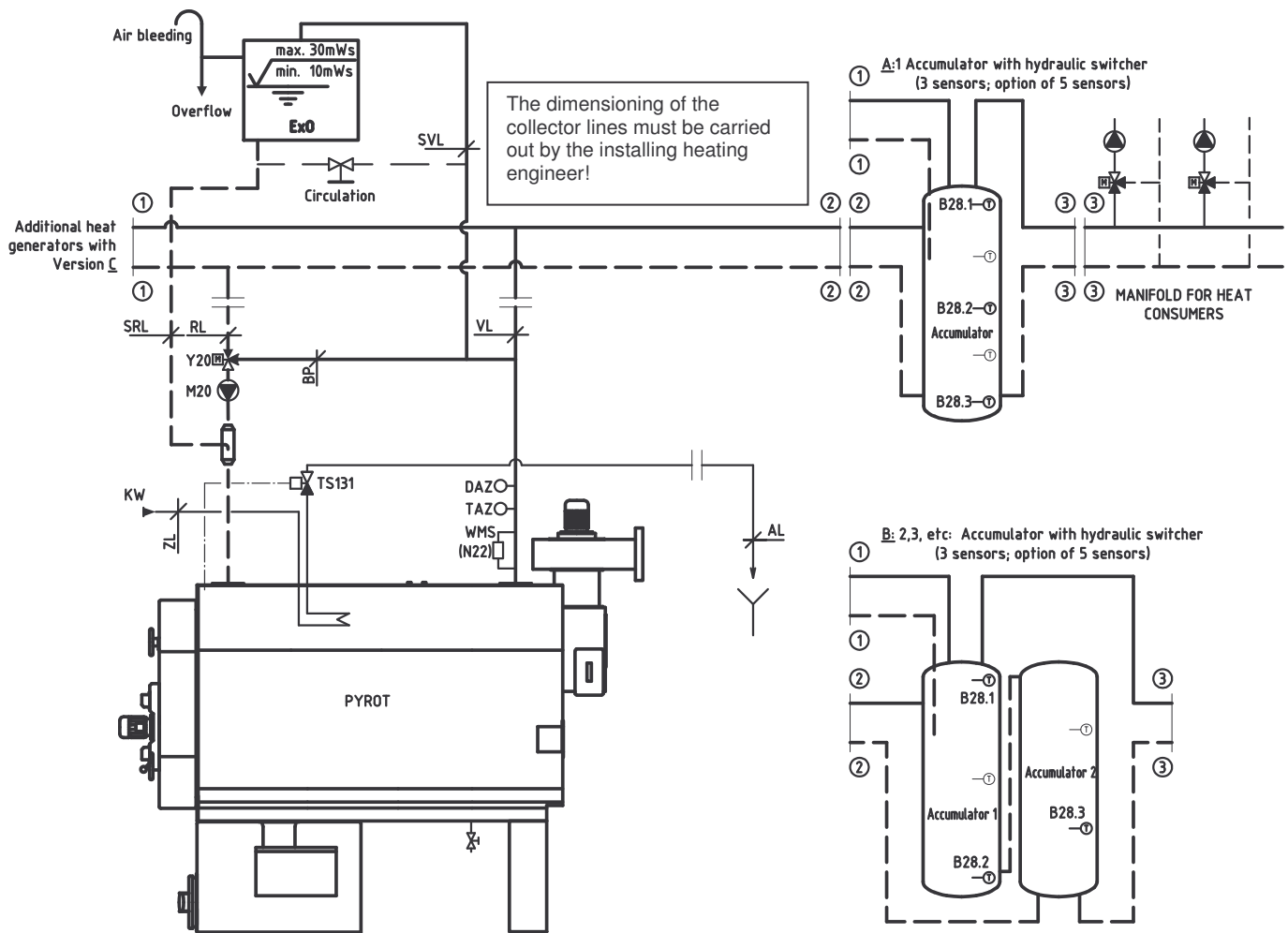
**d) Equipment recommendation from KÖB's delivery programme**

- Note: The equipment below will only be supplied via the installing heating engineer.

Model KPT-	Designation:	Description:	Item no:	See Spec Sheet:
	TS 131	Thermal run-off safety valve, 100 °C	<b>K-TS-131</b>	4500
100	M 20	Grundfos pump UP 32-80, 400V <sup>1)</sup>	<b>ZPS-328-4</b>	4600
150	M 20	Grundfos pump UP 32-80, 400V <sup>1)</sup>	<b>ZPS-328-4</b>	4600
220	M 20	Grundfos pump UPS 40-60 4F, 400V <sup>1)</sup>	<b>ZPS-406-4</b>	4600
300	M 20	Grundfos pump UPS 50-60 4F, 400V <sup>1)</sup>	<b>ZPS-506-4</b>	4600
400	M 20	Grundfos pump UPS 50-60 4F, 400V <sup>1)</sup>	<b>ZPS-506-4</b>	4600
540	M 20	Grundfos pump UPS 65-60 4F, 400V <sup>1)</sup>	<b>ZPS-656-4</b>	4600
100	Y 20	Motor-three way valve, VXG 48.80/SQS 35.00	<b>ZV-3-40</b>	4600
150	Y 20	Motor-three way tap, VBF 21.50/SQK 33	<b>ZH-3-50</b>	4600
220	Y 20	Motor-three way tap, VBF 21.50/SQK 33	<b>ZH-3-50</b>	4600
300	Y 20	Motor-three way tap, VBF 21.65/SQK 33	<b>ZH-3-65</b>	4600
400	Y 20	Motor-three way tap, VBF 21.80/SQK 33	<b>ZH-3-80</b>	4600
540	Y 20	Motor-three way tap, VBF 21.80/SQK 33	<b>ZH-3-80</b>	4600

<sup>1)</sup> For Δt 15K, as per illustration

Any additional resistors (heat meters, slide valve) require redesigning of the boiler pump!



a) Note:

To reliably prevent boiler corrosion caused by condensation of exhaust gases, the boiler return flow temperature must not under any circumstances be below 65 °C. A boiler circuit pump with a boiler mixer should be provided according to the diagram for this purpose. The boiler circuit should be designed such that the temperature difference between the forward flow and the return flow is equal to or less than 15 °C.

For integrating heat consumers, see Spec Sheet 4000.

**b) Safety-relevant equipment included in the scope of performance provided by the installing heating engineer**

M 20	Boiler pump
Y 20	Boiler mixer
TS131	Thermal run-off safety valve R ¾", homologated component; special-purpose design for opening temperature 100 °C, (safety heat exchanger built into boiler). With the Pyrot-400 and Pyrot-540, two safety heat exchangers in parallel are required but only one thermal run-off safety valve. These are not required for open systems, but we advise installing these.
KW	Cold water inlet, min. 2.5 bar, max. 3.5 bar
WMS	Water level control device, homologated component; required in Germany starting from systems over 350 kW, Installation recommendation: WMS with magnetic transmission of the float movement to a switch unit
EL	Air separator (recommendation: absorbtion-type degasser)
ExO	Expansion tank open, at the highest point in the system, heat insulated; for heating system
ExS	Expansion tank closed; with design certification; for safety heat exchanger, max. 4.0 litres, 10 bar
DAZ	Pressure indication device (pressure gauge)
TAZ	Temperature indication device (thermometer)

**c) Boiler circuit with open expansion, accumulator circuit if necessary, design recommendation**

Model KPT-	Boiler circuit (VL, RL, BP)	Thermal run-off safety valve TS-130 (quantity)	Water through-put required at 2.5 bar	Accumulator volume <sup>2)</sup>	Supply line ZL	Drain pipe AL <sup>1)</sup>	Safety forward flow (SVL)	Safety return flow (SRL) <sup>1)</sup>
100	NW 40	1	620 l/h	1500l	R ¾"	R 1"	NW 32	NW 25
150	NW 50	1	915 l/h	1500 l	R ¾"	R 1"	NW 32	NW 32
220	NW 50	1	1230 l/h	2200 l	R ¾"	R 1"	NW 40	NW 32
300	NW 65	1	1500 l/h	2500 l	R ¾"	R 1"	NW 40	NW 32
400	NW 80	1	1880 l/h	3200 l	R ¾"	R 1"	NW 50	NW 40
540	NW 80	1	2266 l/h	4300 l	R ¾"	R 1"	NW 50	NW 40

<sup>1)</sup> Length of the exhaust pipe up to 4.0 m (for longer lines, see DIN 4751 Part 2)

<sup>2)</sup> On request, we will be glad to provide a project-based offer on the accumulator(s).

**d) Equipment recommendation from KÖB's delivery programme**

- Note: The equipment below will only be supplied via the installing heating engineer.

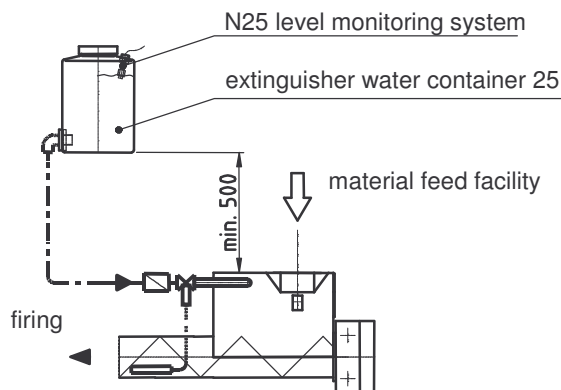
Model KPT-	Designation:	Description:	Item no:	See Spec Sheet:
	TS 131	Thermal run-off safety valve, 100 °C	<b>K-TS-131</b>	4500
100	M 20	Grundfos pump UP 32-80, 400V <sup>1)</sup>	<b>ZPS-328-4</b>	4600
150	M 20	Grundfos pump UP 32-80, 400V <sup>1)</sup>	<b>ZPS-328-4</b>	4600
220	M 20	Grundfos pump UPS 40-60 4F, 400V <sup>1)</sup>	<b>ZPS-406-4</b>	4600
300	M 20	Grundfos pump UPS 50-60 4F, 400V <sup>1)</sup>	<b>ZPS-506-4</b>	4600
400	M 20	Grundfos pump UPS 50-60 4F, 400V <sup>1)</sup>	<b>ZPS-506-4</b>	4600
540	M 20	Grundfos pump UPS 65-60 4F, 400V <sup>1)</sup>	<b>ZPS-656-4</b>	4600
100	Y 20	Motor-three way valve, VXG 48.80/SQS 35.00	<b>ZV-3-40</b>	4600
150	Y 20	Motor-three way tap, VBF 21.50/SQK 33	<b>ZH-3-50</b>	4600
220	Y 20	Motor-three way tap, VBF 21.50/SQK 33	<b>ZH-3-50</b>	4600
300	Y 20	Motor-three way tap, VBF 21.65/SQK 33	<b>ZH-3-65</b>	4600
400	Y 20	Motor-three way tap, VBF 21.80/SQL 33	<b>ZH-3-80</b>	4600
540	Y 20	Motor-three way tap, VBF 21.80/SQL 33	<b>ZH-3-80</b>	4600

<sup>1)</sup> For Δt 15K as per illustration

Any additional resistors (heat meters, slide valve) require redesigning of the boiler pump!

**a) Fire-extinguishing System for Burner Slide-in Module, Art. No. K-SLE**

**Note:** Pyromat-DYN has an extra charge with Art. No. K-SLE (see Spec Sheet 4500)  
With Pyrot and Pyrtec this is included in the burner article.



- Line from container to the 1/2" valve (short as possible)
- Valve adjustment, Danfoss AVTA 15 50-90 °C 3, equivalent to approx. 80 °C

Fig. 1: K-SLE on feed auger

**b) Fire-extinguishing System for Material Feed Facility, Art. No. K-SLV**

For KÖb scope of delivery, refer to Spec Sheet 4500

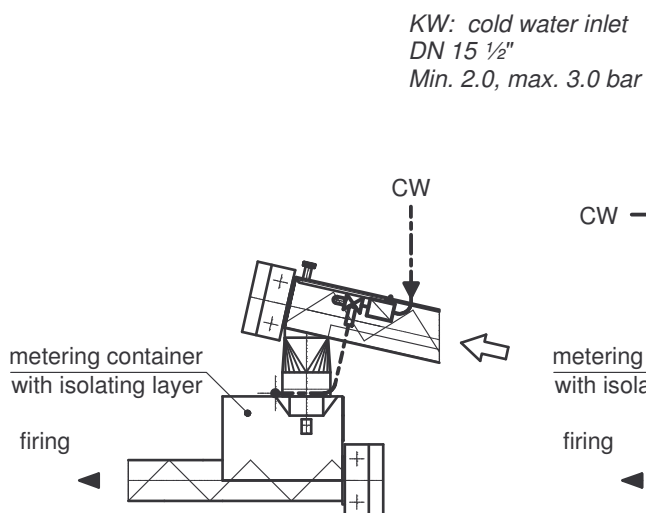


Fig. 2: K-SLV on conveyor auger

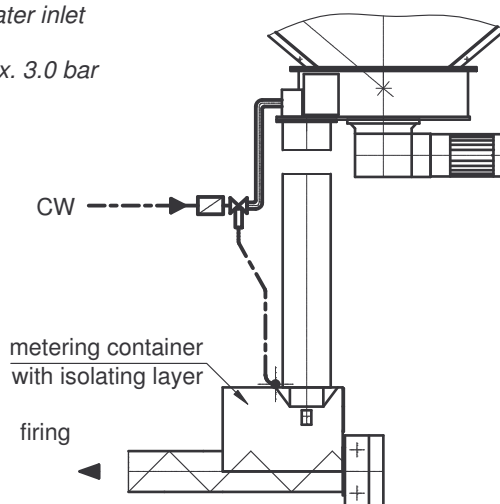


Fig. 3: K-SLV on extractor system situated on top with downpipe

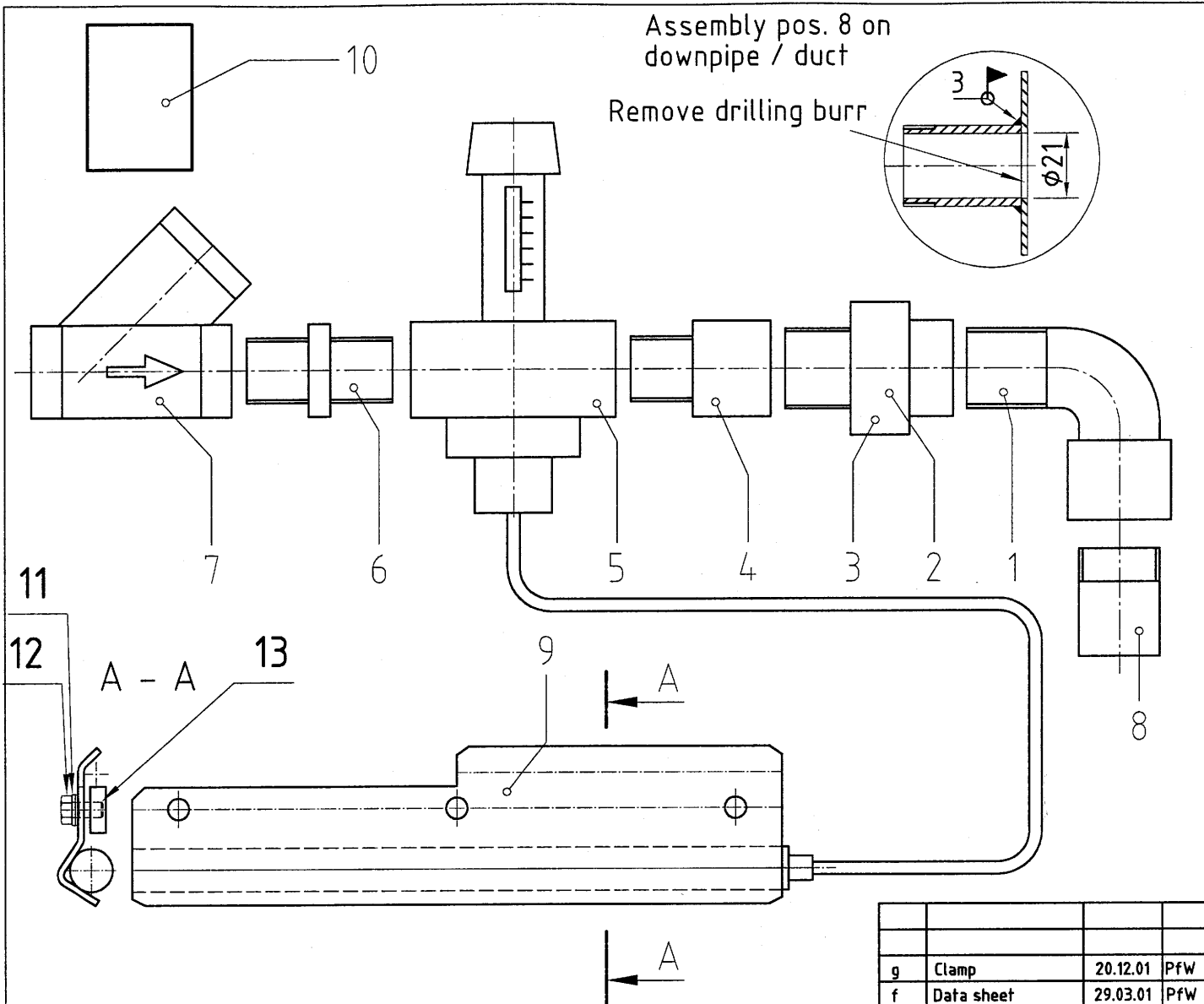
**Be sure to note:**

- The lines must be executed in metal (1/2") with fixed pipework (K-SLE and K-SLV).
- It must not be possible to shut off the cold water inlet without the aid of tools.
- Be especially sure to comply with Point 5 of the Installation Instructions (Fire Prevention).


**Note:**

K-SLV is an alternative or supplementary safety device. As standard, either a slide valve (Art. No. MBA-; included in Article ADF\_... / ADE\_3,0) is required for pressureless material storage sites or a rotary valve (Art. No. MBZ-) for material storage sites with over- or under-pressure (loading with fan, such as wood-processing businesses).





13	1	Rail	F 2637/4		
12	3	Hexagonal nut	ISO 4017 - M5 x 10	Galvanized	
11	3	Strain washer	UN 9069 - M5	Galvanized	
10	1	Data sheet	1400-1		
9	1	Clamp	F 2636/3		
8	1	Welded on end 533			3/4" L= 35mm
7	1	Water filter	1074		1/2"
6	1	Two sided nozzle 280	2210	Galvanized	1/2"
5	1	Extinguisher water valve	1048		Danfoß AVTA15-1/2"
4	1	Reduction sleeve 246	5356	Galvanized	IG 3/4" x AG 1/2"
3	1	Treaded joint 331	5338	Galvanized	3/4"
2	1	Flat seal	1027		3/4" 27/38
1	1	Angle connector 92	3819	Galvanized	3/4"

Pos.	Pcs.	Description		ID no.	Material	Dimensions			
<div><p>A-6922 Wolfurt Tel.: 05574/6770-0    Fax 05574/65707</p></div>		DIN7168 Fine-Medium Rough		Surface	Scale 1:2		Position -	Pieces -	
					-		-	-	
				Date	Name	Fire Extinguisher Additional  Downpipe AP / ascending or cross feeder duct			
		Edited	30.10.97	JoM					
		Checked							
e	Danfoss valve	27.07.00	PfW	Standard					
d	Braukmann valve	06.08.99	FeJ						
c	Danfoss valve	10.12.1998	PfW			Drawing no.: <b>F 2482 / 4g_E</b>		Sheet	
b	add Pos. 2 +3	03.11.1998	JoM					-	
a	Pos. 2 changed	9.01.1998	JoM					Sh	
State Changes		Date	Name	EDV Nr. N:\F\UE\F2482 4g E.dwg					



**Description:**

The PYROT Rotation Heating System (patent no: EP 0 905 442 B1) was developed for automatic incineration of all dry to moist wood fuels (remnant wood, pellets and forest woodchips to max. W35-40).

The PYROT Rotation Heating System is characterised by high efficiencies and perfect incineration at all load levels. The PYROT Boiler Plant has been tested and approved in accordance with the latest quality criteria as per EN 303-5 Heating Boilers for solid fuels, CE-certification in accordance with European Machinery Directive with continuous quality inspection by the TÜV.

Max. forward flow temperature allowed: 100°C  
Max. operating pressure allowed: 3.0 bar  
Safety heat exchanger: Built into the boiler

**How it functions:**

- The feed auger conveys the material to be burned diagonally from below into the firing system. The holding devices for the burn-back sensor and the thermal extinguishing valve are situated on the conveyor pipe. Above the auger, there is a metering container with a light barrier to ascertain the level of the fuel isolating layer required according to TRD 414.
- The material to be burned is ignited automatically by an electric heat gun. The gasification of the fuel is carried out on a feed grate moved by a worm-gear motor. The ash falls in an ash bin below. An automatic de-ashing system is optional. The fire block is lined with highly refractory insulation and fired refractory concrete elements.
- The combustion gases rising from the fire block are swept up by the rotating secondary airflow brought to bear by the rotation blower and burned out completely in the round combustion chamber. The thermal energy from the combustion gases is transmitted to the boiler water in a horizontally positioned pipe-type heat exchanger. The boiler is heavily insulated, cased in an aesthetically pleasing fashion and provided with excellent access through the boiler door on the end side. On the rear side of the boiler there is a flange for an oil burner, which is closed by an insulated blank lid with an inspection window.
- A flue gas recirculation system reduces the temperature in the fire box while maintaining the highest possible degree of efficiency. This increases the service life of the uncooled refractory elements in the incineration zone. With the basic setting, the ratio of recirculated gas to fresh air is geared precisely to the material to be burned. A mechanical flow volume regulator provides a constant ratio of the quantity of recirculated gas to fresh air over the entire output range.
- The exhaust fan is specially designed for wood heating operation and is very quiet. The motor has a solid, heat-resistant design with a heat dissipation hub and is spring-supported. The fan casing on the intake port turns in infinitely variable fashion. The blow-out nozzle is round. Installation is possible on the top, side or rear of the exhaust gas collector.

**Included in the delivery:**

- Feed auger with isolating layer, incl. extinguishing valve with dirt trap, extinguishing water container with holding device
- Fire block with feed grate
- Automatic ignition device
- Boiler with rotation combustion chamber
- Set of displacement rods
- Flue gas recirculation system
- Exhaust fan
- Supplementary air device (draught controller); for installation in the exhaust pipe
- Accessories: counter-flange, incl. bolts, seals and cleaning device

**Requirements on the chimney:**

Installation of a supplementary air device (draught controller) if not possible in the fire tube (see Spec Sheet 6010-3).

**ACCESSORIES for PYROT Rotation Heating System (Item KRT-...) at extra charge:**

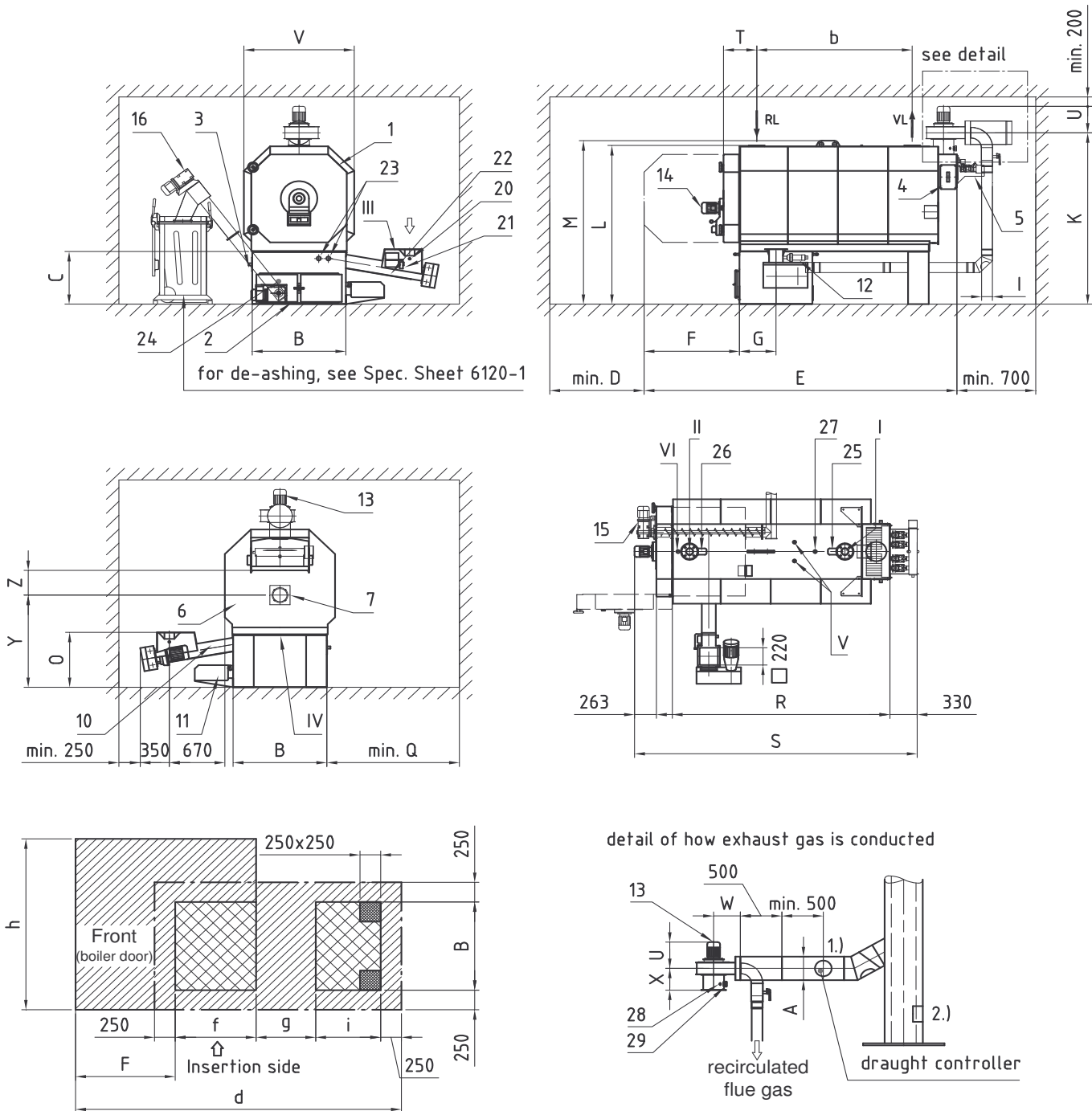
<b>Designation</b>	<b>Item</b>	<b>Text</b>	<b>Dimensions</b>	<b>Use</b>
Exhaust gas deduster 90 l	KRT-E...-1	6110	6110	Optional
De-ashing in bin, 240 l	KRT-A2-S	6120	6120	Optional (standard)
De-ashing in skip, 800 l	KRT-A8-S	6120	—	Variation for KRT-A2-S
De-ashing in base container	KRT-ES-...-S	6120	6120	Variation for KRT-A2-S
Cleaning system, pneumatic	KRT-W...-S	6120	6120	Optional
Operating pressure of 6 bar allowed	KRT-P...	6200	—	Customised design from PYROT 220
Feed auger, two-stage	KRT-P2	6200	—	Optional (switchover: pellets to chips)
Insulation for recirculated flue gas line DN 80	KRT-RZ-IS1	6200	—	Advisable (or insulation by customer)
Insulation for recirculated flue gas line DN 125	KRT-RZ-IS2	6200	—	Advisable (or insulation by customer)
Reduced output:	KRT- VS-...	6200	6200	optional (reduced charge)
Oil burner mounting bracket	KRT-OBW...-S	6300	6300	Optional
Ecotronic control system	ECO-...	6800	—	Required

**Technical specs:**

			PYROT Rotation Heating System					
Trade name			100	150	220	300	400	540
Item No:			KRT- 100	KRT- 150	KRT- 220	KRT- 300	KRT- 400	KRT- 540
Performance data								
Rated heat output		$Q_N$ [kW]	100	150	220	300	400	540
Continuous output <sup>1)</sup>		$Q_D$ [kW]	90	135	200	270	360	480
Minimum heat output <sup>2)</sup>		$Q_{min}$ [kW]	30	45	60	80	100	140
Efficiency in operation to be performed		[%]	90-92					
Maximum water content <sup>3)</sup>		[%]	W 40					
Size of the chips <sup>4)</sup>			G 30 / G 50 as per ÖNORM M7133					
Exhaust gas figures								
Mass flow rate $Q_N$ ; W5; O <sub>2</sub> 6%;		[g/s]	53.6	80.4	117.9	160.8	214.4	289.44
Volume flow $Q_N$ ; W5; O <sub>2</sub> 6%; 150 °C		[m³/s]	0.06	0.09	0.14	0.19	0.25	0.35
Mass flow rate $Q_{W35}$ ; W35; O <sub>2</sub> 8%;		[g/s]	71.3	106.9	156.9	213.9	285.2	385.1
Volume flow $Q_{W35}$ ; W35; O <sub>2</sub> 8%; 150 °C		[m³/s]	0.08	0.12	0.19	0.25	0.34	0.46
Average exhaust gas temperature at $Q_N$ <sup>5)</sup>		[°C]	160					
Average exhaust gas temperature at $Q_{min}$ <sup>5)</sup>		[°C]	130					
Chimney draught required		[Pa]	+0					
Electrical connections								
Electrical connections, total		[kW]	2.67	2.67	2.85	3.6	3.98	3.63
Ignition device		[kW]	1.6					
Exhaust gas fan		[kW]	0.55	0.55	0.55	0.75	1.1	1.1
Articulated head fan		[kW]	0.12					
Feed auger		[kW]	0.37	0.37	0.55	1.1	1.1	0.75
Grate drive unit		[kW]	0.03	0.03	0.03	0.03	0.06	0.06
Electric power consumption at $Q_N$		[kW]	0.85	1.032	1.108	1.521	1.868	1.753
Electric power consumption at $Q_{min}$		[kW]	0.28	0.355	0.369	0.434	0.480	0.460
Heating-relevant specs								
Volume on heating gas side		[ltr]	325	374	744	883	1340	1613
Volume of ash container for grate ash		[ltr]	26	32	45	55	75	91
Volume of ash container for exhaust gas de-duster		[ltr]	90					
Water-bearing resistance (Diff. 15 K)		[mbar]	38	33	76	42	29	56
Boiler water volume		[ltr]	395	432	794	903	1326	1510
Heating surface		[m²]	8.28	10.78	16.04	20.72	28.76	39.36
Test pressure <sup>6)</sup>		[bar]	5					
Maximum operating pressure <sup>6)</sup>		[bar]	3					
Maximum boiler temperature		[°C]	100					
Minimum return temperature		[°C]	65					
Weights								
Weight of fire block		[kg]	432	477	581	641	778	937
Weight of boiler <sup>7)</sup>		[kg]	1278	1451	2119	2441	3235	3671
Weight of displacement rods		[kg]	68	87	141	163	220	289
Weight of exhaust blower		[kg]	37	40	40	45	62	62
Weight of feed auger		[kg]	143	143	143	143	143	149
Total weight without water <sup>8)</sup>		[kg]	1958	2198	3024	3433	4438	5108
Total weight with water <sup>8)</sup>		[ka]	2353	2630	3818	4336	5764	6618

- <sup>1)</sup> Continuous output: Output levelling out as base load boiler in continuous operation with pneumatic cleaning system (for track time, see Operating Instructions)
- <sup>2)</sup>  $Q \geq Q_{min}$  : Operation with modulated control (Infinitely variable power control)  
 $Q \leq Q_{min}$  : Low load with ON  $Q_{min}$  / OFF (Stop-and-go mode)
- <sup>3)</sup> Moist fuels: >W35 further limitations regarding output, degree of efficiency and control behaviour
- <sup>4)</sup> Specification: See Spec Sheet 1010, Minimum Requirements for Wooden Fuels
- <sup>5)</sup> Exhaust gas temperature: An increase is possible by removing the displacement rods ( $Q_N + 30$  °C;  $Q_{min} + 10$  °C)  
Other influences: Fuel, water content, ash content, pneumatic cleaning system yes/no;  
track time (number of operating hours without cleaning)  
Specifications for the start of the track time (toward the end of the track time there is an increase in the exhaust gas temperature by approx. 20 °C)
- <sup>6)</sup> At extra charge: 7.8 bar test pressure; 6 bar operational pressure;
- <sup>7)</sup> Weights: Incl. door and refractory concrete lining
- <sup>8)</sup> Total weight: Incl. displacement rods

**Dimensional drawing:**



Boiler bearing surface



Bottom with heat-resistant design: extra



The surface of the floor has to be free of any pipes or installation lines !  
The effects of heat would create a danger !

- 1.) Draught controller in the exhaust pipe:  
included in scope of supply  
Position: as close as possible to the chimney
- 2.) Draught controller in chimney, at bottom:  
supplied by customer  
Necessary: when not possible in exhaust pipe

**Connections/dimensions:**

PYRTEC [Item-Nr.]		KRT-100	KRT-150	KRT-220	KRT-300	KRT-400	KRT-540
<b>Water connections PN 6 (see Spec Sheet 6960)</b>							
I	Boiler forward flow	R 2" IG	R 2" IG	DN 80 PN6	DN 80 PN6	DN100 PN6	DN100 PN6
II	Boiler return flow	R 2" IG	R 2" IG	DN 80 PN6	DN 80 PN6	DN100 PN6	DN100 PN6
III	Connection for extinguishing water	R ¾"					
IV	Drain valve for boiler	R 1½" IG					
V	Safety heat exchanger	2 x R ½" AG	2 x R ½" AG	2 x R ½" AG	2 x R ½" AG	4 x R ½" AG	4 x R ½" AG
VI	Dipping shell for thermal run-off safety valve	R ½" IG					
<b>Connection exhaust gas pipe Ø [mm]</b>		A	200	250	250	300	350
<b>Location of the connections [mm]</b>		b	1291	1541	1525	1875	2030
<b>Dimensions of the foundations [mm]</b>		d	2803	2850	3130	3613	4103
		f	640	740	740	880	1095
		g	423	520	520	723	543
		h	1570	1570	2050	2050	2460
		i	620	620	680	680	800
<b>Dimensions of the boiler [mm]</b>		B	870	870	1150	1150	1390
		C	673	673	673	673	750
		D	1920	1920	2200	2200	2440
		E	2870	3120	3424	3780	4232
		F	870	870	1150	1150	1390
		G	320	370	370	440	548
		I	DN 80	DN 80	DN 80	DN 125	DN 125
		K	1891	1908	2168	2182	2457
		L	1765	1765	2024	2024	2262
		M	1825	1825	2084	2084	2422 <sup>(1)</sup>
		O	700	700	700	700	742
		Q	700	700	900	900	1100
		R	2000	2250	2274	2630	2614
		S	2785	3035	3059	3415	3457
		T	392	392	406	406	466
		U	345	358	358	352	375
		V	1050	1050	1330	1330	1570
		W	292	292	292	323	323
		X	245	232	257	277	355
		Y	1093	1093	1179	1179	1219
		Z		303	316	316	319

1) With PYROT 400/540: Suspension gear is detachable

17) With motor 400/540: Suspension gear is detachable			
<b>Parts for maintenance</b>			
1	Boiler door with rotation fan		
2	Ash doors for the grate ash (2 units)		
3	Maintenance cover for firing block		
4	Cleaning lid for exhaust gas collector		
5	Pneumatic cleaning system	Item KRT-W...-S	Spec Sheet 6120
6	Recirculated flue gas line, variable arrangement of line		
<b>Accessories for oil burner</b>			
7	Flange for burner mounting bracket; standard design: sealing cover with sight glass		
<b>Electric drives &amp; ignition</b>			
10	Feed auger		
11	Drive for feed grate		
12	Ignition device		
13	Exhaust fan		
14	Articulated head fan		
15	De-ashing system for fire block	Item KRT-E.-S	/ Spec Sheet 6120
16	De-ashing system for ascending conveyor auger	Item KRT-E.-S	/ Spec Sheet 6120
<b>Switches and sensors</b>		These items are part of the Ecotronic control system	Item PRT-... / Spec Sheet 6800
20	Light barrier for feed auger		
21	Limit switch for maintenance cover		
22	Temperature sensor for feed auger		
23	Light barrier for embers (2 units)		
24	Light barrier for de-ashing		
25	Boiler sensor		
26	Return flow sensor		
27	Temperature-limiting safety switch (STB)		
28	Exhaust gas sensor	Location:	Spec Sheet 6010
29	Lambda sensor with measuring transducer	Location:	Spec Sheet 6010

**Description:****Exhaust gas de-duster 90 litres** [Item no. KRT-E...-1]

The exhaust gas deduster is for minimising dust emissions and is executed as a multi-cyclone with an axial function. The deduster is completely insulated, attractively encased and provided with three lids for cleaning. The crude gas space is cleaned via the cleaning lid on the side. The clean gas chamber is cleaned via the top or rear cleaning lid (fan connection not used).

The ash container, which is provided with a trolley, connects to the deduster by quick-action fasteners and moves out simply for emptying. The exhaust fan (see description of PYROT) is mounted either on top or on the side, as desired.

*Note: The exhaust gas deduster is required for the PYROT with fuels with high amounts of fine particles.*

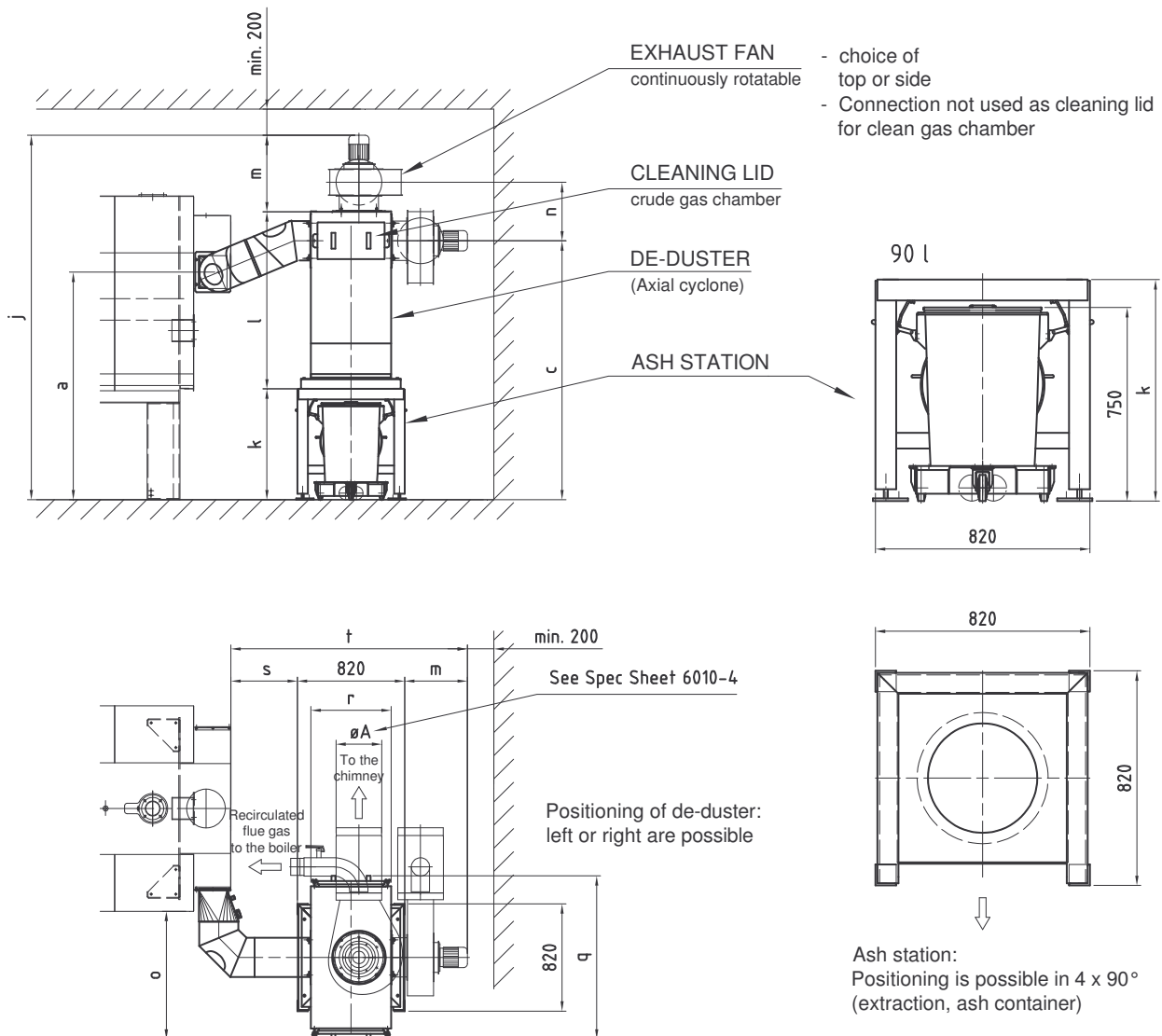
*(Woodworking businesses, forest woodchips with fine particles amounting to more than 4%)*

*One ash bin comes with the system.*

*Additional ash bins have to be ordered separately.*

**Ash Bin, 90 litres, reserve** [Item No. EB-90]

**Dimensions and data:**



Exhaust gas de-duster PYROT [Item no.]	KRT-E150-1	KRT-E300-1	KRT-E400-1	KRT-E540-1
<b>Dimensions:</b>				
A [mm]	200	250	300	300
a [mm]	1521	1621	1671	1741
c [mm]	1518	1775	1875	1949
j [mm]	2338	2634	2835	2930
k [mm]	850	850	850	920
l [mm]	898	1155	1247	1247
m [mm]	590	629	730	730
n [mm]	465	497	582	582
o [mm]	545	530	977	977
r [mm]	820	820	820	820
s [mm]	280	70	370	370
t [mm]	1690	1519	1920	1920
u [mm]	-	-	1250	1250

Note: See Spec Sheet 6010 on how the exhaust gas is conducted

**Description:**
**De-ashing in Ash Bin 240 litres** [Item No. KRT-A2-S]

**De-ashing in Ash Skip, 800 litres** [Item No. KRT-A8-S]

Complete auger de-ashing from the ash chamber for the fire block into an externally situated movable galvanised ash bin (standard 240 litres). A light barrier control system keeps the level of the ashes constantly over the auger. As a result, the ash in the ash pan under the incineration system can burn out, and in normal operation only cool ash that has burned out is conveyed into the container.

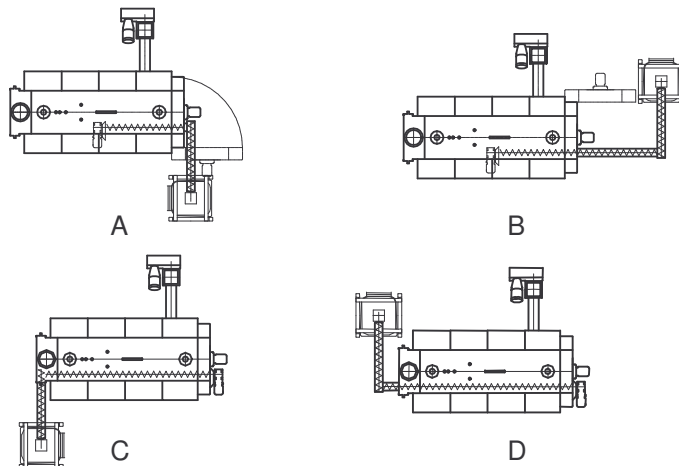
Delivery includes:

- Boiler ash pan with ash level control system and de-ashing auger made of high-temperature steel
- Drive via worm-gear motor
- Connection station with moveable ash bin
- Triggering system for the worm drives
- Infrared light barrier for level monitoring of ash in fire box

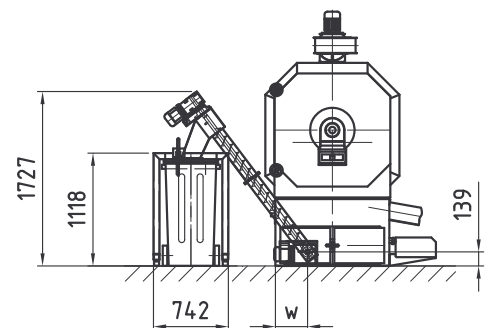
**Data and dimensions for de-ashing into ash bin, 240 litres:**

PYROT	KRT -100	KRT- 150	KRT- 220	KRT- 300	KRT- 400	KRT- 540
[Item No.]	KRT-EA2 -S					
Dimensions:						
w [mm]	249	249	319	319	301	301
x [mm]	953	1023	1023	1193	1273	1408

Connection station with moveable ash bin; mountable at 90° and thus making it possible to select the direction in which it moves out.



Standard

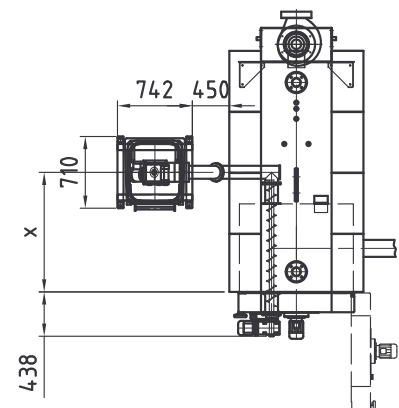


Standard variations and A-D are also possible in mirror-inverted fashion.

**Extension of ascending conveyor auger per metre** [Item No. KRT-ASM]

**Extension of de-ashing auger per metre** [Item No. KRT-AFM]

**Ash bin, 240 l, reserve** [Item No. EB-240]

**Ash skip, 800 l, reserve** [Item No. EC-800]




**Description:**

**De-ashing in Base Container** [Item No. KRT-ES-100-S]  
**De-ashing in Base Container** [Item No. KRT-ES-150-S]  
**De-ashing in Base Container** [Item No. KRT-ES-220-S]  
**De-ashing in Base Container** [Item No. KRT-ES-300-S]  
**De-ashing in Base Container** [Item No. KRT-ES-400-S]  
**De-ashing in Base Container** [Item No. KRT-ES-540-S]

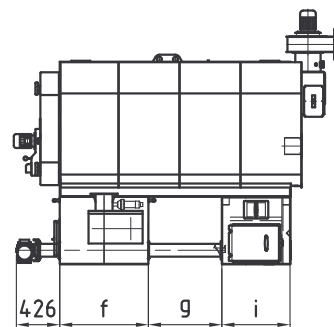
Complete auger de-ashing out of the ash chamber for the fire block into the base container situated under the boiler with maximum volume. A light barrier control system keeps the level of the ashes constantly over the auger. As a result, the ash in the ash pan under the incineration system can burn out, and in normal operation only cool ash that has burned out is conveyed into the container. With the large base container, maximum maintenance-free intervals are achieved.

Delivery includes:

Boiler ash pan with ash level control system and de-ashing auger made of high-temperature steel

Drive via worm-gear motor

- Base container with maximum volume and two maintenance doors for removing ash by vacuum or kindling utensils
- Control of the de-ashing by light barrier


**Data and dimensions for de-ashing in base container:**

PYROT	KRT- 100	KRT- 150	KRT- 220	KRT- 300	KRT- 400	KRT- 540	
[Item No.]	KRT-ES-100-S	KRT-ES-150-S	KRT-ES-220-S	KRT-ES-300-S	KRT-ES-400-S	KRT-ES-540-S	
Dimensions:							
f	[mm]	640	740	740	880	960	1096
g	[mm]	448	450	513	787	456	551
i	[mm]	593	593	680	680	800	800
Volume of base container:							
	[litres]	220	240	360	380	600	700
Weight of complete de-ashing system: (in addition to boiler weight)							
	[kg]	300	320	340	360	380	400



**Description:****Pneumatic Cleaning System** [Item No. KRT-W100-S]**Pneumatic Cleaning System** [Item No. KRT-W150-S]**Pneumatic Cleaning System** [Item No. KRT-W220-S]**Pneumatic Cleaning System** [Item No. KRT-W300-S]**Pneumatic Cleaning System** [Item No. KRT-W400-S]**Pneumatic Cleaning System** [Item No. KRT-W540-S]

The complete pipe-type heat exchanger is cleaned by periodic impulses of compressed air when in operation. The process of cleaning takes place as blasts of the various sections that follow one after the other. The detaching of the ash on the heat exchanger pipes is carried out by very short but strong pressure impulses. The detached particles are carried by the flow of gas to the de-asher, where most of them are separated off. The system is built into the rear side of the boiler. The compressor should preferably be installed at a cool spot in the heating room.

How the control system works:

The number of cleaning cycles within one time unit (e.g. per hour) is adapted to the loading of the boiler. One individual, complete cleaning cycle consists of a series of pressure impulses over all the sections of the heat exchanger.

Delivery includes:

- Nozzle element integrated in the exhaust gas collector, incl. connection piece with heat dissipation plates
- Compressed air distributor with container and valve; with high-temperature hoses connected to the nozzle element
- Compressor model 362-100; special design for municipal use  
Delivery capacity of 202 l/min; 100-l container; pressure of max. 10 bar; motor 2.2 kW, 1450 RPM, 230V;  
incl. pressure controller, pressure switch and operating time limiter; plug and play; noise level of standard design: 75 dBA
- Compressed air hose to max. of 4.0m in length
- Valves permanently wired on terminal strip
- Software component in the control system

To be carried out by the customer:

- Provide a mains socket, 230V/ 16A

**Technical Data:**

<b>PYROT</b>	<b>KRT-100</b>	<b>KRT-150</b>	<b>KRT-220</b>	<b>KRT300</b>	<b>KRT-400</b>	<b>KRT-540</b>
<b>[Item No.]</b>	<b>KRT-W100-S</b>	<b>KRT-W150-S</b>	<b>KRT-W220-S</b>	<b>KRT-W300-S</b>	<b>KRT-W400-S</b>	<b>KRT-W540-S</b>
Number of zones/valves	3	4	4	4	5	6
Size of the valves	G 1"	G 1"	G 1"	G 1"	G 1"	G 1"
Max. air consumption at full load [l/h]	1300	1300	2500	2500	3300	4500

**Extra Charge for Soundproofed Compressor** [Item No. KT-WK]

Compressor in Special design for municipal use with soundproofing hood, model 362-100; delivery capacity: 202 l/min; container 100 l; pressure max. 10 bar; motor 2.2 kW, 1450 RPM, 230V; incl. pressure controller and pressure switch, plug and play; noise level of 64 dBA

When this item is used, the compressor listed in the item "Pneumatic Cleaning System" is no longer required.

**Reduced Price for Compressed Air Provided by Customer** [Item No. KT-WL]

As a result, the compressor listed in the item "Pneumatic Cleaning System" is no longer required. The compressor provided by the customer has to deliver at least the quantity and quality of air specified and have an adjustable pressure controller as well as a safeguard against hose rupture (e.g. operating time limiter).

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**PYROT - Ecotronic** [Item No: ECO-300]**PYROT - Ecotronic** [Item No: ECO-540]

A microprocessor control system for the complete PYROT Boiler Plant, incl. control of the systems for the fuel loading necessary for the articles listed separately. The heat output of the furnace adjusts to the heat consumption in modulating fashion. A regulating circuit for an incineration optimising system is superimposed on the output control circuit with a lambda sensor. Maximum quality criteria are met in terms of fire protection and personal protection.

**Functions:**

- Automatic ignition
- Output and control circuits with modulating output operation (25%-100%)
- Air-conducted by means of a speed-regulated exhaust fan, depending on the forward flow temperature
- Precise resupplying of fuel by the feed auger from the metering container with an isolating layer
- Refilling of the metering container with the use of a level monitoring system
- Limitation and distribution of the mass burning in the fire box by means of a level monitoring system in the fire box along with movement of the feed grate
- Emissions-optimised control circuit:
- Optimised air supply through motor-operated air vents for the best possible incineration using a lambda sensor
- Upholding the return flow temperature with the boiler mixer provides for a long service life of the boiler.
- Control system for oil burner on the PYROT
- Safety functions for:
  - Excess temperature, burn-back, opening of a lid in the loading system and forced heat dissipation
  - Floating output (malfunction indication system)

**Operation:**

Operation is carried out by means of a control panel with a membrane keyboard and plain language display. All the operational data can be read on the display.

The set points for all the important parameters can be entered simply using the keyboard. Malfunctions are displayed in plain language and indicated in the order of their occurrence.

**The following items come with the system:**

A microprocessor control system (control panel with back-lit plain language display), CE-tested, battery-backed real-time clock, RS 232 serial interface for connection to PC.

Data transmission line from the control panel to the control cabinet; length: 10 m

- Control cabinet (uninstalled), surface powder-coated with RAL 7035 (grey) textured  
Executed according to ÖVE/VDE-guidelines, ready-wired on series terminals,  
Feed: 3x400 V 50 Hz; control voltage: 230 V or 24 V
- Adapted, updatable software
- Startec for all the drives for the loader system (3x400 V) according to the items priced separately
- Protective motor switch for boiler pump
- Outputs for stepping motors (air vents)
- Frequency transformer (EMC-Operation Class 3) for exhaust fan

**In the door:**

- 4-pin master switch
- Documentation, incl. bound circuit diagram, terminal connection diagram with cable designation, operating and maintenance instructions, installation instructions in document sleeve
- Sensors and switches mounted on the feed auger
  - Infrared light barrier level monitoring system, insulating layer for feed auger
  - Safety limit switch on the maintenance lid for the feed auger
  - PT-100 temperature sensor feed auger
- Sensors and switches on the firing block for firing and in the exhaust gas nozzle (installation on site)
  - Infrared light barriers for level monitoring of fuel in the fire box
  - Zirconium dioxide sensor with instrument reading converter (lambda sensor)
  - PT-100 exhaust gas sensor
- Sensors and switches mounted on the boiler on top
  - KTY boiler sensor in the connecting piece, forward flow
  - KTY return flow sensor in the connecting piece, return flow
  - Temperature-limiting safety switch (TLSS)
- Sensor, uninstalled

- One KTY sensor with dipping shell, 1/2 " x 280 mm (B28.1, see Spec Sheet 6960-1)

**Extensions available for the PYROT Ecotronic Control System (Article ECO-...) at an extra charge:**

**PYROT Single-unit System:**

<b>Designation</b>	<b>Article</b>	<b>Text</b>	<b>Use</b>
Heat generator, bivalent	ECO-KP0	4030	Integration System for Electric Boiler
Heat generator, bivalent	ECO-KP1	4030	Integration System for Oil/gas-fired Boiler
Controller for Room Heating System	ECO-H	4040	optional
Controller for Annex Building	ECO-N	4040	optional
Controller for Pipelining System	ECO-F	4040	optional
Controller for Air Heater	ECO-L	4040	optional
Controller for Utility Water Heater	ECO-B.	4040	optional
Controller for Utility Water Circulation System	ECO-BZ	4040	optional
Controller for Solar-powered Utility Water Heater	ECO-S1	4050	optional
Controller for Solar-powered Utility Water/Heating	ECO-S3	4050	optional
Visualisation System for PYROT, internal	ECO-VIR	4090	optional (for customer's PC workplace)
Output Management System	ECO-...	6810	Additional heat generation functions
Remote transmission	ECO-...	6820	Visualisation, remote maintenance

The control system components for the fuelling system are included in the articles for the various loader systems.  
For external fuelling system, see Spec Sheet 6800-3.

**PYROT Double-unit System:**

**The Mastercontrol control system (see Spec Sheet 6850) is mandatory for the installation of a PYROT double-unit system.**

The PYROT double-unit system is a heat-generating facility, in which the load allocated to the biomass is distributed to two PYROT boilers. The entire thermal load generated is conducted to a joint accumulator in the form of a hydraulic switcher.

It is necessary to comply with the following for this type of system:

1. Joint fuelling system: Mastercontrol

The control of the joint fuelling system for the PYROT double-unit system is carried out by the Mastercontrol control system. The control system components for the fuelling system are included in the articles for the various loader systems.

2. Additional heat generators: Mastercontrol

Extensions for controlling additional heat generators are only allowed in the Mastercontrol (additional control cabinet) and not in the individual boiler control system (ECO-300 or ECO-540).

3. PYROT Ecotronic Control System, as an individual boiler control system

Only the extensions listed in Spec Sheet 6850 are possible in the Mastercontrol control system.

The PYROT double-unit system is not designed to control heat consumers. (Such control is carried out by customer-provided building instrumentation and control equipment.)

Using a Mastercontrol turns the PYROT Ecotronic control system into an individual boiler control system, without any further extensions being possible.

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**Triggering System for external drive [Art. No. ECO-A10]**

## Function:

Starttec motor starter for optimised connection of an external conveyor drive or rotary valve without reversal. A CAN bus is used to directly connect the motors to the gentle start-up system via the Ecotronic. Temperature-monitored and protected against overloading. Its electronic circuit breakers are wear-free, even at high switching frequencies.

## Comes with:

- Starttec completely integrated in control cabinet
- Parameter assignment for the drive function
- Input in the control cabinet for safety end switch on the maintenance cover
- Output in the control cabinet for external conveyor drive

## To be carried out by the customer:

- Delivery and/or installation of safety end switch for the external conveyor drive

*Note: Only for PYROT. Starttec is built into the control cabinet for the boiler plant.*

*Only possible with defined, limited material feed facility (upstream conveyor auger)*

**Triggering System for external drive with light barrier [Art. No. ECO-A11]**

## Function:

Starttec motor starter for optimised connection of an external conveyor drive without reversal. A CAN bus is used to directly connect the motors to the gentle start-up system via the Ecotronic. Temperature-monitored and protected against overloading. Its electronic circuit breakers are wear-free, even at high switching frequencies. Additional protection of the external drive through level-monitoring system of the further feed system by means of light barrier. The light barrier connects directly to the Starttec for the continuing feed system, affecting the extraction system.

## Comes with:

- Starttec completely integrated in control cabinet
- Parameter assignment for the drive function
- Input in the control cabinet for safety end switch on the maintenance cover
- Output in the control cabinet for external conveyor drive
- Infrared light barrier, level-monitoring system for fuel

## To be carried out by the customer:

- Delivery and/or installation of safety end switch for the external conveyor drive

*Note: Only for PYROT. Starttec is built into the control cabinet for the boiler plant.*

*Note: The control system components below are reserved for the PYROT Single-unit System.  
With the PYROT Double-unit System, these functions are included in the Mastercontrol.*

**Accumulator Management System 3 Sensors [Item No: ECO-KSF3]****Function:**

With a heat exchanger used, the modulating output operation by the PYROT Rotation Heating System is optimised. In addition, short-term heat requirement peaks are covered. The heat accumulated in the accumulator is detected by a temperature sensor. The heat input is adjusted to the degree to which the accumulator is charged.

**Included in delivery:**

- Two additional KTY sensors with dipping shell, 1/2 " x 280 mm (B28.2, B28.3, see Spec Sheet 6960-1)

**Accumulator Management System, 5 Sensors (QM) [Item No: ECO-KSF5]****Function:**

Using a heat accumulator improves the modulating output operation of the PYROT rotation heating system. In addition, sudden heat requirement peaks are covered. The accumulator's load of heat is detected by the temperature sensors. The instruction for the accumulator's degree of loading is carried out by the external sensor in weather-guided fashion. The firing power is adapted to the accumulator's degree of loading.

**Included in delivery:**

- 4 additional KTY sensors with dipping shell, 1/2" x 280 mm (B28.2, B28.3; see Spec Sheet 6960-1)

*Note: For Art. No ECO-KSF5, Article ECO-BM-00 or ECO-RM-00 is also necessary.  
See Spec Sheets 4000 and 4020.*

**External Requirement ON/OFF [Item No: ECO-ANP]**

Input for switching the system on and of automatically by an external floating make contact

**Operational Message [Item No: ECO-KBM]****Function:**

Output of the "Operating Load" operating condition, when the PYROT boiler is in operation to higher-level instrumentation and control equipment for further processing

**Included in delivery:**

- Floating output (operational message)

**Output signals 0 V - 10 V [Item No: ECO-KLS]****Function:**

The system included in delivery output of the boiler output in the form of a voltage signal and preparation for connection to receive a maximum limitation of the boiler output.

The following items come with the system:

- Output of the boiler output, 0 V - 10 V
- Reception and processing of an external output limitation
  - 0 V - 0.5 V... OFF
  - 0.6 V - 3 V... Standby
  - 3.1 V - 10 V... 30% to 100% output operation

*Note: Installation of "Output signals 0 V - 10 V" are possible according to "QM for Wood Heating Systems" irrespective of any additional control system components to be used.*

**Mastercontrol** [Art. No. ECO-M1]

Mastercontrol improves the overall generation of heat by two biomass boilers (PYROT double-unit system), incl. the control of a bivalent boiler (oil-fired boiler, gas-fired boiler or electric boiler) as a redundant unit and/or as a peak-load boiler.

**Function:**

- Heat management system: optimum breakdown of the necessary heating capacity among the two biomass boilers with the main load on the primary boiler and the remaining load on the secondary boiler, this being done by means of output specification. The output specification is carried out in weather-guided fashion, depending on the desired temperature set in a joint hydraulic switcher. Automatic change between the two boilers to guarantee even loading of the boilers over a long operating period. (Example: weekly changeover)
- Loader system: If the fuel for the two biomass boilers is taken from a joint fuel storage unit, then the loader system is controlled by the Mastercontrol system up to the fuel distribution.
- Data management system:  
A complete package for transferring all the data to an external customer-provided IT-workplace for visualisation, remote maintenance and archiving of operational data for the PYROT boiler system. Hardware, incl. modem and software, are integrated in the Mastercontrol system. All the adjustable parameters can be changed from the external IT-workplace.

**Operation:**

Operation is carried out either by means of a touch screen built into the control cabinet (extra charge for touch screen) or by the monitor, keyboard and PC-mouse provided by the customer.

**Includes:**

- Switch cabinet, uninstalled; surface powder-coated in RAL 7035 (grey) texture  
Designed in accordance with ÖVE/VDE guidelines, ready-wired on series terminals  
Feed: 3 x 400V 50 Hz; control voltage 230V or 24V
  - Freely programmable control system, CE-tested; battery-buffered programme and real-time clock
  - Industrial PC
  - Starttec for all loader system drives (3 x 400V) in accordance with the separate price items
  - DVI-interface for a TFT monitor and USB-interface for keyboard, mouse and printer built into the cable lead-through bar on the control cabinet.
  - Floating output (error report)
- In the door:
  - 4-pin master switch
  - Documentation, including bound circuit diagram, terminal connection plan with cable identification in document sleeve
- Accumulator management system, 5 sensors (QA)
  - 5 PT100 sensors, with dipping shell 1/2" x 280 mm
- Output specifications for both biomass boilers
  - Output specifications for both biomass boilers for further processing in the lower-level boiler control systems via serial interface
- Visualisation per modem
  - Analogue modem in switch cabinet
  - Windows operating system, pc-Anywhere remote-maintenance software and visualization/archiving software installed and tested on an industrial PC
- Screen images:
  - Three-dimensional boiler cross-section with display fields
  - Installation diagram, heat generation, with display fields
  - Parameter table (with editing feature)
- To be carried out by the customer:
  - Electric connection from telephone line to modem

**Touch Screen** [Art. No. ECO-TSC]

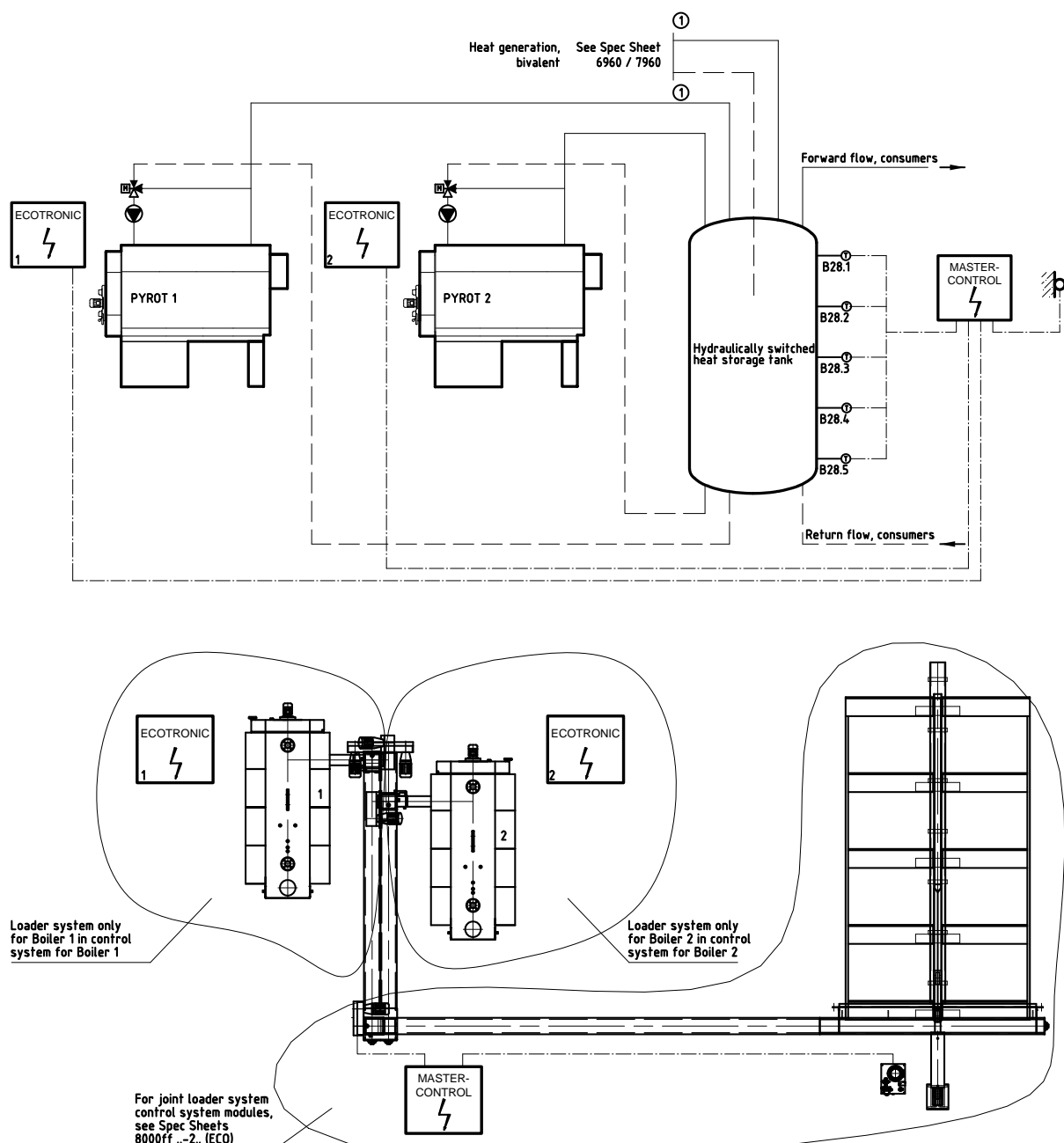
The touch screen (15") is built into the door of the control cabinet and can be used to call up and change all the relevant boiler and loader system parameters.

**Extensions available for the Mastercontrol (article ECO-M1) at an extra charge:**

Designation	Article	Text	Dimensions	Use
Prompt for additional heat generator	ECO-KP0	4030	-	Integration system for electric boiler
Prompt for additional heat generator	ECO-KP1	4030	-	Integration system for oil/gas-fired boiler
Output signals, 0-10V and control equipment	ECO-KLS	6810	-	For higher-level building instrumentation
Malfunction indication by modem (wire)	ECO-SMD	6820	-	optional (advisable)
Export operational data and control equipment	ECO-SED	6820	-	For higher-level building instrumentation
Touch Screen	ECO-TSC	6850	-	optional
Fuel Conveyance System	...-1..	8000ff	8000ff	For joint loader system

**Diagram (top: hydraulic system; bottom: loader system):**

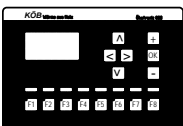
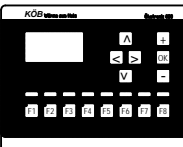
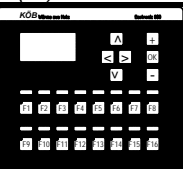
Note: Water-bearing installation and electrical installation are provided by the customer.



**Controllers possible in the Ecotronic for PYROMAT-ECO, PYROMAT-DYN and PYROT**

Type of controller	Designation	Art. No.	Push-buttons	Number of controllers	Number of sensors	Spec Sheet no.
Controllers for additional heat generators	Heat generator, single	ECO-KE	1	1	-	4030
	Heat generator, gliding	ECO-KG	1	1	1	4030
	Heat generator, parallel	ECO-KP0	1	2	-	4030
	Heat generator, parallel 1	ECO-KP1	1	2	1	4030
	Heat generator, parallel 2	ECO-KP2	1	2	1	4030
	Accumulator management system, 5 sensors (QM)	ECO-KSF5	-	1	2	6800
Controllers for room heating units	Room heating	ECO-H	1	1	1	4040
	Annex buildings	ECO-N	1	2	2	4040
	Pipelining	ECO-F	1	1	1	4040
	Air handling unit group	ECO-L	1	1	1	4040
	Thermostat for ECO-H, N	ECO-ZR-QA	-	-	1	4040
	Safety thermostat ECO-H, N, F	ECO-ZR-RA	-	-	-	4040
Controllers for domestic water	Domestic water heater (without quantity control system)	ECO-B1	1	1	1	4040
	Domestic water heater (with quantity control system)	ECO-B2	1	1	2	4040
	Domestic water circulation system	ECO-BZ	1	1	-	4040
Controllers for solar systems	Solar domestic water heater	ECO-S1	1	1	2	4050
	Solar domestic water heating system	ECO-S3	1	2	2	4050

**Modules and combinations possible (see Spec Sheet 4020):**

Extra charge for control system module Extra charge for control module	Without control system module	1 Control System Module 1 x ECO-RM-00	2 Control System Modules 2 x ECO-RM-00	3 Control System Modules 3 x ECO-RM-00
 Control module Standard 4 (5*) control buttons	Standard without extra charge. No heating control unit is possible.	A maximum of 4 controllers and 7 sensors are possible.	A maximum of 4 (5)* controllers and 14 sensors are possible.	
 Control module with extended control system Art. No. <b>ECO-BM-00</b> 4 (5*) Control buttons	A maximum of 3 controllers and 3 sensors are possible.	Extended control system in the control module and control system module A maximum of 4 (5)* controllers and 10 sensors are possible.		
 Control module with extended keyboard Art. No. <b>ECO-13</b> 12 (13*) control buttons		A maximum of 4 controllers and 7 sensors are possible.	2 Control System Modules A maximum of 8 controllers and 14 sensors are possible.	3 Control System Modules A maximum of 12 (13)* controllers and 21 sensors are possible.

With regard to visualisation, remote maintenance and data archiving, refer to Spec Sheet 4090



### Control Module with Extended Control System [Art. No. ECO-BM-00]

The ECOTRONIC is a decentralised microprocessor system in which various modules are connected to a data transmission line (CAN-bus). A limited number of controllers (2-3 units) can be integrated in the control module cost-effectively.

Includes:

- Control module in compact design instead of standard design
- Weather sensor QAC 31, uninstalled

### Control System Module [Art. No. ECO-RM-00]

A control system module to accommodate external controllers (for heat consumers/additional heat generators). The control buttons are integrated in the control module.

Includes:

- Control System Module in plastic casing (length: 325 mm; height: 195 mm; depth 75 mm)
- Weather sensor QAC 31, uninstalled

### Control Module with Extended Keyboard [Art. No. ECO-13]

A control module with an additional row of buttons to operate a maximum of:

12 controllers (Pyromat-DYN)
13 controllers (Pyromat-ECO)

### Data transmission line with plug, 10.0 m standard [Art. No. ECO-ZL-10,0]

### Data transmission line with plug, 2.0 m [Art. No. ECO-ZL-2,0]

### Data transmission line with plug, 5.0 m [Art. No. ECO-ZL-5,0]

### Data transmission line with plug, 20.0 m [Art. No. ECO-ZL-20,0]

### Data transmission line with plug, 40.0 m [Art. No. ECO-ZL-40,0]

### Data transmission line with plug, 80.0 m [Art. No. ECO-ZL-80,0]

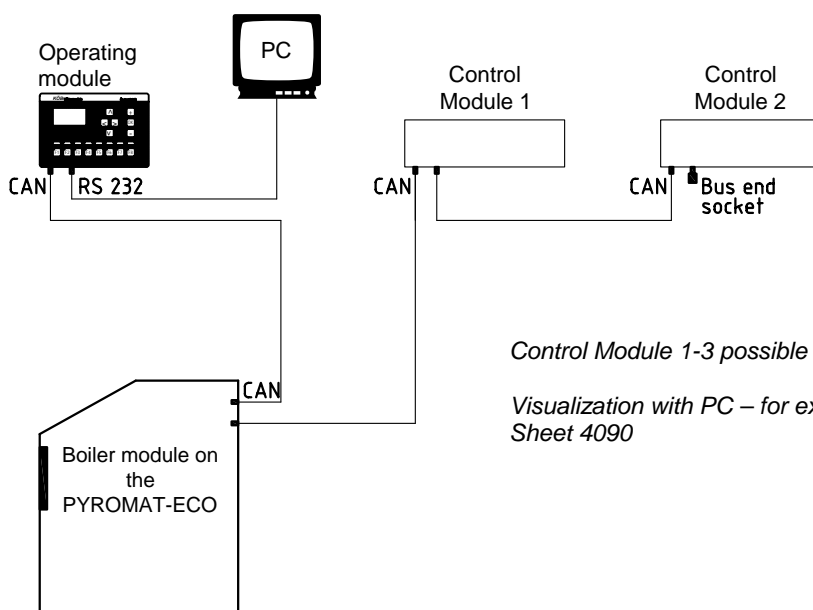
### Data line with Y distributor [Art.-Nr. ECO-ZY-0,5]

The data transmission line connects the various modules (burner module, control module & control system module) to the overall facility control system. The data transmission lines can be connected to one another (maximum of two lines). The maximum overall length of the data transmission line must not exceed 100 m.

Note:

*The sum of all CAN bus lines must not exceed 200 m.*

### Example of how to connect the CAN-BUS cables for the PYROMAT-ECO:

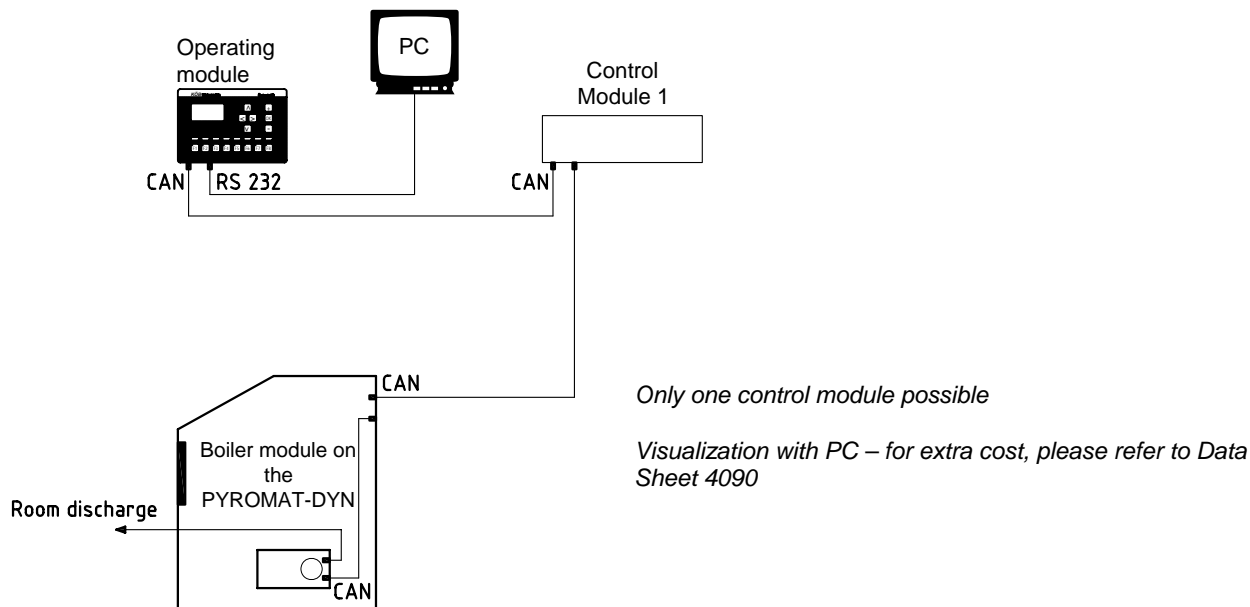


*Control Module 1-3 possible*

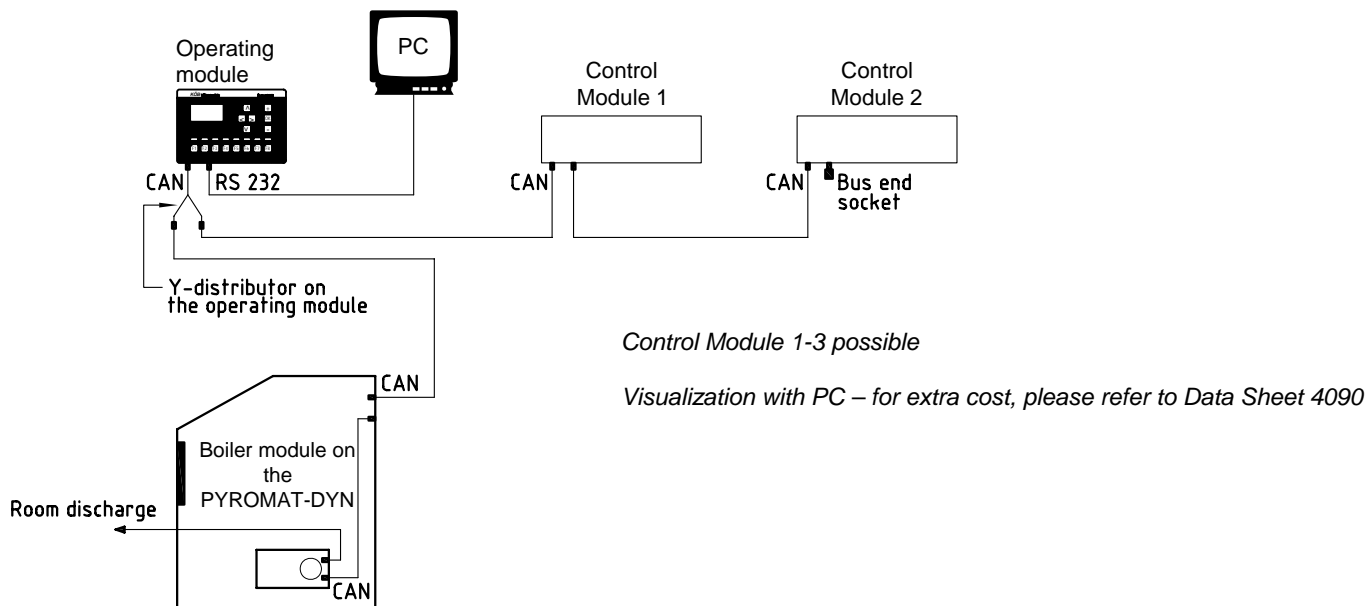
*Visualization with PC – for extra cost, please refer to Data Sheet 4090*

**Example of how to connect the CAN-BUS cables for the PYROMAT-DYN:**

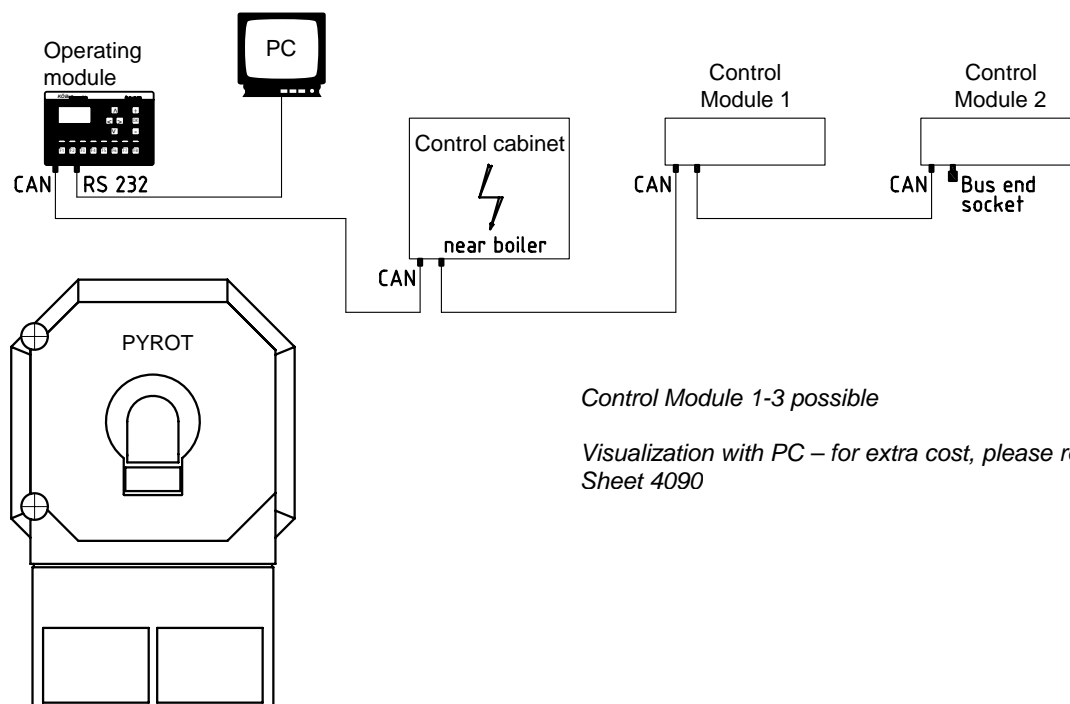
**Version 1: Control module in the heating room**



**Version 2: Decentral control module (e.g. in annex building)**



**Example of how to connect the CAN-BUS cables for the PYROT:**



*Control Module 1-3 possible*

*Visualization with PC – for extra cost, please refer to Data Sheet 4090*

**Controller for Heat Generator, single [Art. No. ECO-KE]**

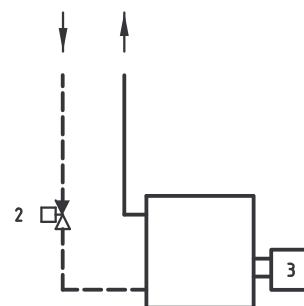
Immediately after heat is taken from the accumulator to cover a heat requirement (stand-alone operation), an additional heat generator is automatically connected. The accumulator can only be loaded using the PYROMAT. When it is put into operation, the additional heat generator disconnects, and the closed shut-off valve prevents it from being flowed through.

Includes:

- Pushbuttons for additional heat generators
- Controller output for shut-off valve (2) and burner (3)

*Note: Only for PYROMAT-ECO and PYROMAT-DYN with ECO function.*

*See Hydraulic Drawing 2960 PYROMAT-ECO or 3950 PYROMAT-DYN with ECO function.*


**Controller for Heat Generator, single, gliding [Art. No. ECO-KG]**

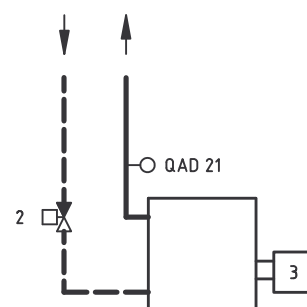
Immediately after heat is taken from the accumulator to cover a heat requirement (stand-alone operation), an additional heat generator is automatically connected. The accumulator can only be loaded using the PYROMAT. When it is put into operation, the additional heat generator disconnects, and the closed shut-off valve prevents it from being flowed through. The burner temperature is adjusted in gliding fashion to the minimum temperature according to the heat requirement.

Includes:

- Pushbuttons for additional heat generators
- Controller output for shut-off valve (2) and burner (3)
- Flow sensor QAD 21, uninstalled

*Note: Only for PYROMAT-ECO and PYROMAT-DYN with ECO function.*

*See Hydraulic Drawing 2960 PYROMAT-ECO or 3950 PYROMAT-DYN with ECO function.*


**Controller for Heat Generator, parallel [Art. No. ECO-KP2]**

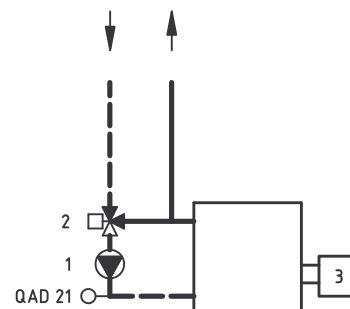
When required, an additional heat generator is automatically connected. This may occur after heat is taken from the accumulator to cover the overall heat requirement (stand-alone operation). Or the additional heat generator may be used to cover a peak requirement for heat (parallel operation to the PYROMAT). For parallel operation, a burner group is necessary for heat diversion, which simultaneously also provides for keeping up the return flow. On request, the additional heat generator can load the accumulator (as desired to B28.1, B28.2 or B28.3).

Includes:

- Pushbuttons for additional heat generators
- Controller output for pump (1), mixing valve (2) and burner (3)
- Return flow sensor QAD 21, uninstalled

*Note: Only for PYROMAT-ECO and PYROMAT-DYN with ECO function.*

*See Hydraulic Drawing 2960 PYROMAT-ECO or 3950 PYROMAT-DYN with ECO function.*

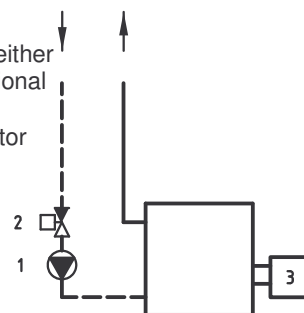


### Parallel heat generator control [Art.-No.: ECO-KP0]

The additional heat generator designed as a hydraulic switch supplies heat to the storage unit either separately or in conjunction with the biomass boiler. It is controlled in such a way that the additional heat generator covers the required peak and the biomass boiler covers the basic requirements taking account of the biomass boiler's delayed response. The boiler pump is active and the motor shut-off device is open during the additional heat generator's operating phase.

Included in the delivery:

- Button for additional heat generator
- Boiler pump contactor and motor protection device (additional heat generator)
- Control output for pump (1), mixing valve (2) and burner (3)



*Attention: Only for PYROMAT-DYN without ECO function and PYROT with hydraulic switch.*

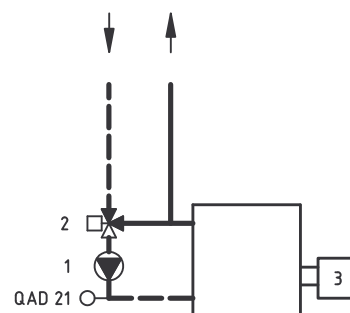
*See Hydraulic Drawing 3950 PYROMAT-ECO or 6960 PYROMAT-DYN with ECO function*

### Controller for Heat Generator, parallel [Art. No. ECO-KP1]

When required, an additional heat generator is automatically connected. This may occur after heat is taken from the accumulator to cover the overall heat requirement (stand-alone operation). Or the additional heat generator may be used to cover a peak requirement for heat (parallel operation to the PYROMAT). For parallel operation, a burner group is necessary for heat diversion, which simultaneously also provides for keeping up the return flow. On request, the additional heat generator can load the accumulator (as desired to B28.1, B28.2 or B28.3).

Includes:

- Pushbuttons for additional heat generators
- Controller output for pump (1), mixing valve (2) and burner (3)
- Return flow sensor QAD 21, uninstalled



*Attention: Only for PYROMAT-DYN without ECO function and PYROT with hydraulic switch.*

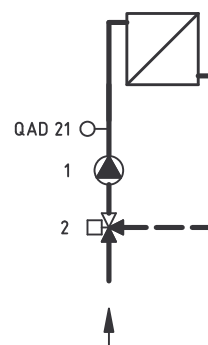
*See Hydraulic Drawing 3950 PYROMAT-ECO or 6960 PYROMAT-DYN with ECO function.*

### Controller for Room Heating Units [Art. No. ECO-H]

A weather-guided heating control system with a digital timer for lowerable operation according to daily or weekly schedules, with pump control system, frost-protection function, ECOcircuit and limited flow temperature.

Includes:

- Pushbutton for heating
- Controller output for pump (1) and mixing valve (2)
- Flow sensor QAD 21, uninstalled



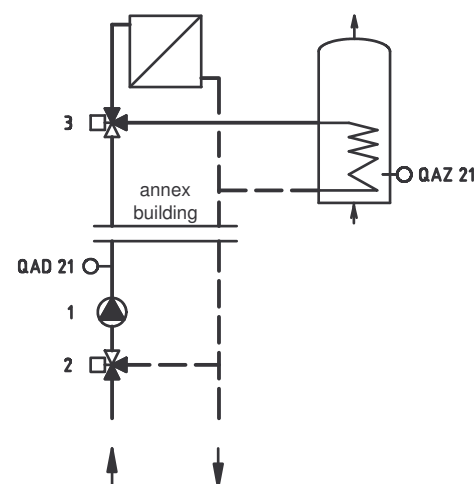
### Controller for Annex Buildings [Art. No. ECO-N]

How it works:

The pipelining is usually loaded with a lowered temperature according to the weather-guided heating control system. The domestic water heater is loaded at the maximum flow temperature set. To do so, a valve deflects the heating water to the domestic water heater. Using an integrated timer, this is moved to ancillary times, when the room heating unit is interrupted for short durations.

Includes:

- Pushbutton for annex building
- Controller output for pump (1), mixing valve (1) and changeover valve (3)
- Flow sensor QAD 21, uninstalled
- Domestic water sensor QAZ 21.5220 with dipping shell 1/2" x 200 mm, uninstalled



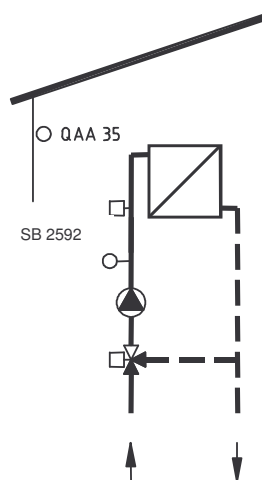
### Thermostat QAA 35 [Art. No. ECO-ZR-QA]

Thermostat QAA 35, uninstalled; a supplement to the Controller for Room Heating Units (Art. No. ECO-H) and Controller for Annex Buildings (Art. No. ECO-N). The Thermostat can be connected as a remote control device and as a room sensor (room temperature compensation).

### Safety Thermostat SB 2592 [Art. No. ECO-ZR-RA]

Safety Thermostat SB 2592, uninstalled

To safely and reliably limit the flow temperature of a heating circuit (e.g. ECO-H, ECO-N, ECO-F).



### Controller for Pipelining [Art. No. ECO-F]

For annex buildings with separate heat distributions systems, which are supplied with heat via pipelining. The temperature of the pipeline is pre-adjusted for the lowest line losses according to the heat distribution requirement.

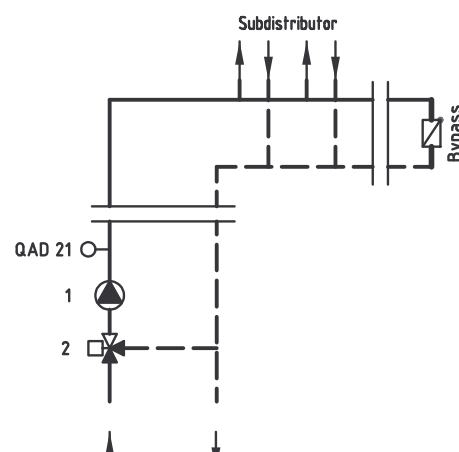
Includes:

- Pushbutton for pipelining
- Controller output for pump (1) and control valve (2)
- Flow sensor QAD 21, uninstalled

Note:

*The Controller for Pipelining cannot be used to control a pipeline to which heating control units provided by the customer are connected!*

*A normal heating control system has to be used in such cases.*

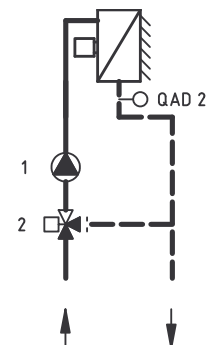


**Controller for Air Handling Unit Group [Art. No. ECO-L]**

The burner storage system supplies the air heaters with maximum flow temperature. The fans are switched by switches or controllers provided by the customer. The flow rate for the heating water is controlled by the return flow temperature and so adjusted to the heat output of the air heater (quantity control). This produces optimum storage stratification for a long time and at a high temperature at the accumulator flow pipe. An integrated timer can be used to set the heating periods (daily and weekly schedules).

Includes:

- Pushbutton for air handling unit group
- Controller output for pump (1) and mixing valve (2)
- Return flow sensor QAD 21, uninstalled
- Baffle bypass

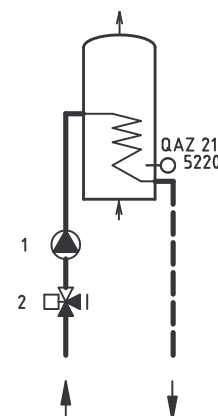

**Controller for Domestic Water Heater [Art. No. ECO-B1]**

When the temperature of the domestic water drops, it is reheated by the built-in heat exchanger either from the burner or from the heat accumulator. A prerequisite for this is the temperature difference required (choice of control either according to temperature difference or fixed temperature).

An integrated timer can be used to set the heating periods (daily and weekly schedules).

Includes:

- Pushbutton for domestic water heater
- Controller output for pump (1) and shut-off valve (2)
- Domestic water sensor QAZ 21.5220 with dipping shell, 1/2" x 200 mm, uninstalled

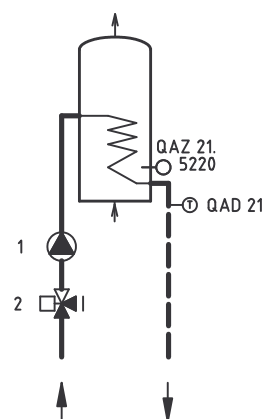

**Controller for Domestic Water Heater [Art. No. ECO-B2]**

When the temperature of the domestic water drops, it is reheated by the built-in heat exchanger either from the burner or from the heat accumulator. A prerequisite for this is the temperature difference required (there is a choice of control either according to temperature difference or fixed temperature).

The flow rate for the heating water is controlled by the return flow temperature (quantity control). This produces optimum storage stratification for a long time and at a high temperature at the accumulator flow pipe. An integrated timer can be used to set the heating periods (daily and weekly schedules).

Includes:

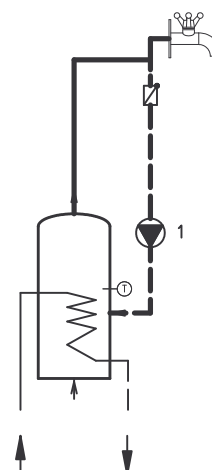
- Pushbutton for domestic water heater
- Controller output for pump (1) and control valve (2)
- Return flow sensor QAD 21, uninstalled
- Domestic water sensor QAZ 21.5220 with dipping shell, 1/2" x 200 mm, uninstalled


**Controller for Domestic Water Circulation System [Art. No. ECO-BZ]**

An integrated timer can be used to set the circulation periods (daily and weekly schedules). The duration for the circulation pump to be switched on can be adjusted using a cyclical switching system.

Includes:

- Pushbutton for circulation system
- Controller output for pump (1)



**Controller for Solar Domestic Water Heater [Art. No. ECO-S1]**

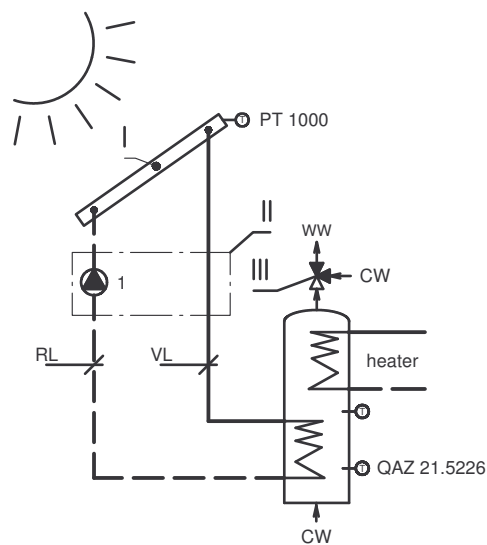
For use in simple solar facilities as a single control circuit for heating the domestic water in a solar domestic water heater (Art. No: WSS-...). The ECO-S1 controller is a supplementary module for the ECO-B1(2) Controller for Domestic Water Heaters. When the solar collector is warmer than the domestic water at the bottom, the solar collector heats it up (adjustable temperature difference: 2-20°C).

**Further details:**

- Post-flow period of the solar pump, no/yes: 0-120 sec., adjustable according to length of line
- Maximum domestic water temperature (adjustable: 20-90°C)
- Safety: disconnection of the solar pump at a collector temperature of 140°C; reconnection at 120°C

**Includes:**

- Pushbutton for solar system
- Collector sensor PT-1000
- Domestic water sensor QAZ 21.5220
- Controller output for solar pump (1)



- I. solar collector
- II. solar station with solar pump
- III. thermostatic water mixer

**Controller for Solar Domestic Water/Heating [Art. No. ECO-S3]**

For use in large-scale solar facilities to heat the domestic water in a solar domestic water heater (Art. No: WSS-...) and to supply heat to the heat accumulator in the form of a triple control circuit heating system. The first circuit is for heating the domestic water, the second circuit is for heating the heat accumulator at the back/bottom and the third circuit is for heating the heat accumulator at the front/top. The heat accumulator is heated by an externally situated plate heat exchanger. When there is a changeover from the domestic water heater to the heat accumulator, the secondary pump is switched on, which is then operated with the solar pump. For optimised functioning, the flow rate in the secondary circuit has to be adapted to the primary circuit (e.g. with flow rate gauges in the primary and secondary circuits).

The following temperature differences are freely adjustable:

Temperature difference of collector/domestic water: 2-20°C

Temperature difference of collector/accumulator, back/bottom: 2-20°C

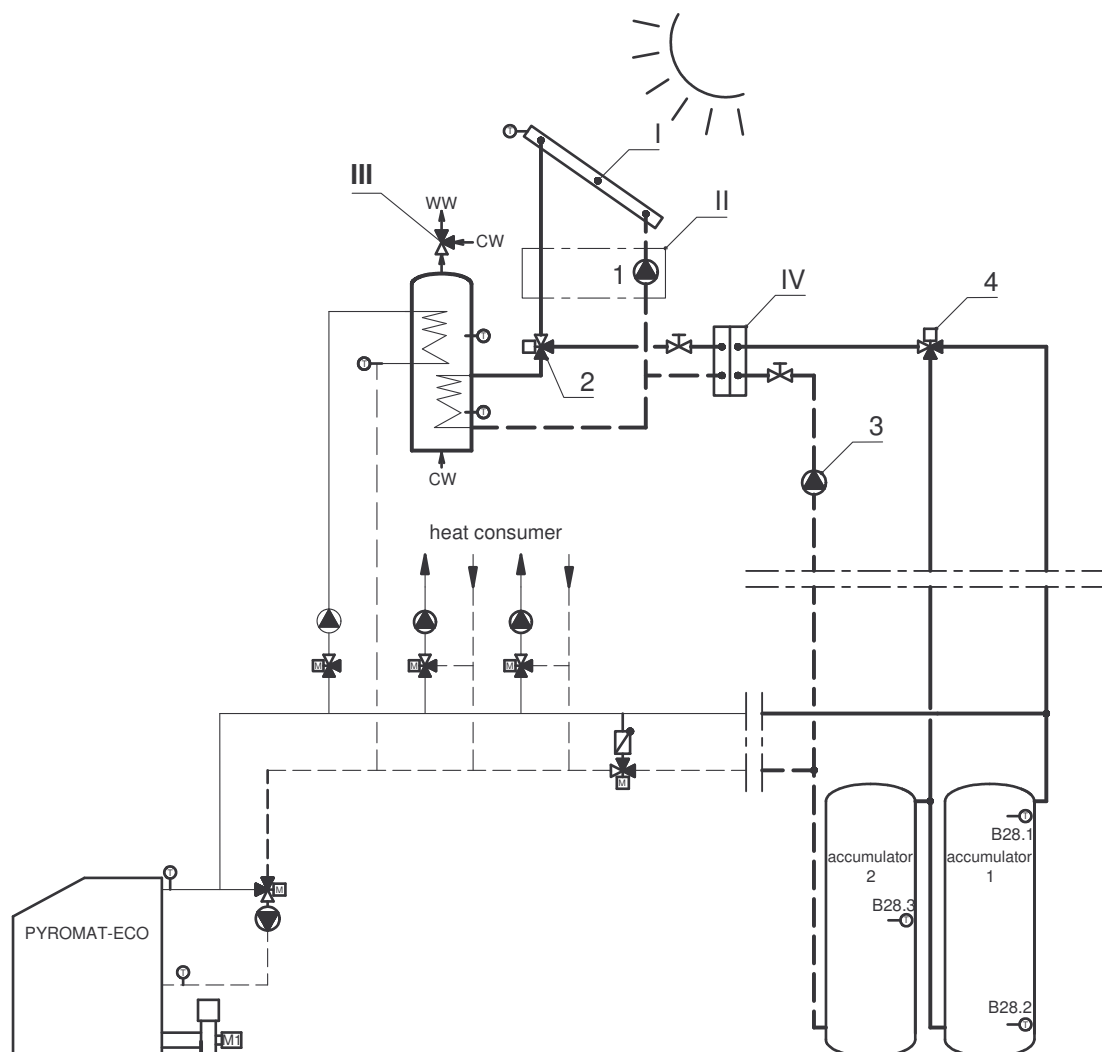
**Further details:**

- Post-flow period of the solar pump, no/yes: 0-120 sec., adjustable according to length of line
- Disconnection safeguard: At collector temperature of 140°C  
At accumulator temperature of 95°C
- Optimised domestic water priority (option of either absolute domestic water priority or none at all)
- Stratified accumulator loading according to the accumulator temperatures, via valve/accumulator, back/accumulator front (4)

**Includes:**

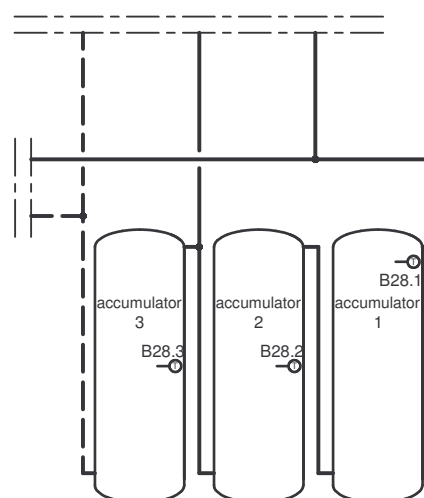
- Pushbutton for solar system
- Collector sensor PT-1000
- Domestic water sensor QAZ 21.5220
- Controller output for solar pump (1)
- Controller output for valve, domestic water heater/accumulator (2)
- Controller output for secondary pump (3)
- Controller output for valve, accumulator back/accumulator front (4)





example  
2 accumulators in series

example  
3 accumulators in series



- I. solar collector
- II. solar station with solar pump
- III. thermostatic water mixer
- IV. plate heat exchanger
- 1. solar pump
- 2. inlet valve domestic water / accumulator
- 3. secondary pump
- 4. inlet valve accumulator front / back

**Visualisation of Pyromat Internally [ECO-VIM]****Visualisation of Pyrot Internally [ECO-VIR]**

All the data is conducted to the PC by a data transmission line (max. 30 m) to the PC via the serial interface RS 232 on the control module. The burner system's current operational data is shown in visualised fashion in a function display along with all the possibilities of entering values and functions and of reading out the operational conditions (exception: "Start Burner"). All the operational data is archived cyclically and can be graphically evaluated in a very simple fashion.

The PC and data transmission line are not included in the price.

Includes:

- CD with visualisation software and installation instructions.

*Note: Demand external PC:*

*Operating System Windows 98 / 2000 / XP*

*Free Harddiscstorage 50 MB*

*Main Memory 128 MB RAM*

*for each boiler 1 Free serial interface*

**Visualisation Supplementary Function [ECO-VIZ]**

Extended visualisation [ECO- VII] with the functions of the keys additionally activated (from F4). Additional functions include each heating control unit (heat generator, heat consumer, solar system) as well as the automatic loading system (Pyromat DYN, Pyrot). Each function of the keys is displayed in a separate function display along with all the possibilities of entering values, reading out the operational conditions and archiving.

The price is per each additionally activated key on the control module.

Includes:

- Extension of the CD with visualisation software

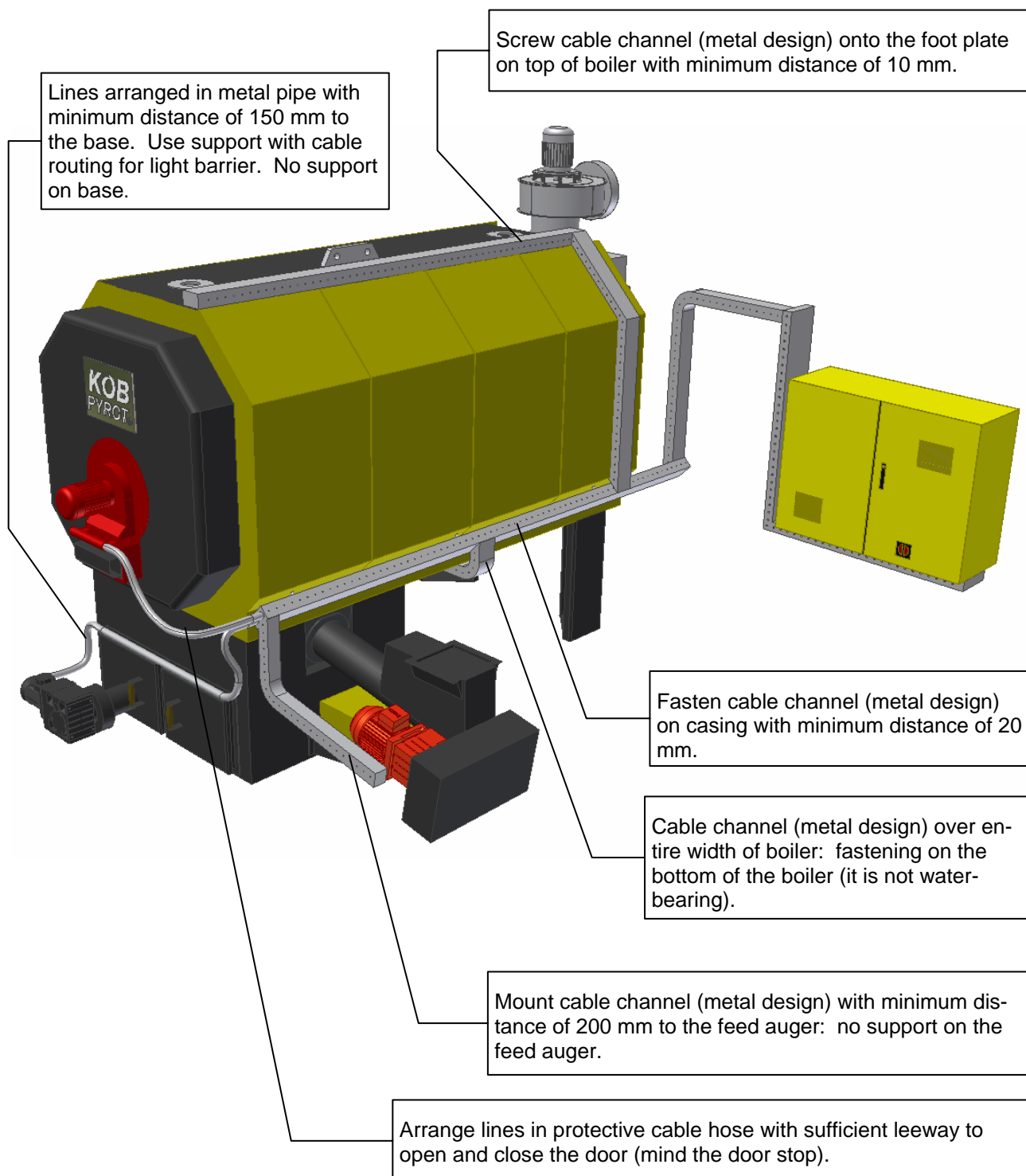
*Note: For equipping possibilities, refer to Spec Sheet 4000-1*

**Data Transmission Line for Visualisation of Interior [ECO-ZLV]**

Data transmission line consisting of:

- D-SUB plug for connecting control module to data transmission line, soldered
- 30 m data transmission line, triple-pole (cut to length according to dimension at location)

D-SUB plug with threaded terminal ends, 9-pole, uninstalled, for connecting PC



**Installation (one fitter with helper provided by the customer) [Art. No. IMO-1]**

Performance provided by the contractor (supplier):

Furnishing the entire scope of the delivery. Installing the burner system, incl. all the machinery parts and facility components contacted by fuel and exhaust gas for the scope of delivery cited. Also included is the installation of all the limit switches, thermostats, probes and sensors supplied (exceptions: weather sensors and heat consumers).

The installation will be carried out by an experienced fitter (a qualified helper being required).

Price, incl. travel, expenses and overnight accommodation.

Performance provided by the client (buyer):

1.) Prior to installation of the burner system

- a) Equipping of construction site as follows:  
Paved access road to the construction site;  
230-V current supply line and, if necessary, 400 V for electric installation tools (welding apparatus);
- b) General construction work, as follows:  
Making all the installation holes required for the installation;  
Making the cement foundations and recesses for refill access lids and casings of extraction equipment;  
Pits and breakthroughs for fuel conveying equipment
- c) Construction work in particular as follows:  
Hydraulic sliding bar extraction system:  
Moving and setting in concrete the securing brackets supplied (if included in the scope of the delivery);  
Making the securing brackets (if not in the scope of the delivery). Due to the great forces that develop, this performance should be furnished according to the instructions of an expert (architect or structural engineer) in accordance with the supplier's specifications;  
Making the chimney system with the connecting hole for the exhaust pipe (exception: metal chimney included in the scope of the delivery);
- d) Draining the heating room and silo room with all the ducts and shafts required for installing the entire facility.
- e) Unloading the scope of the delivery from the truck unless the delivery has been expressly agreed with a crane truck.

2.) Helpers during the installation of the burner system

Providing a qualified helper to be available during the entire duration of the installation. Requirements for the helper:

- a) Qualified  
for installation work in steel and machinery construction (skilled at using hand tools)
- b) Physically sturdy  
no restriction to lifting loads, no restrictions to working up to heights of 3.0 m above the floor, no restrictions to hearing or sight
- c) Communicative and mentally stable  
good knowledge of German and mentally stable such that he can immediately follow the installation supervisor's verbal safety instructions
- d) Available  
during the agreed week days (Monday to Friday) from 7:00 AM until 6:00 PM
- e) Equipped  
with protective equipment according to the applicable regulations on industrial safety

3.) After the installation of the burner system

- a) Installation of the control cabinets delivered and/or the control modules  
Unless expressly agreed otherwise, these must be installed by the authorised electrician.
- b) Installation of weather sensor and probes for the heat consumers in the scope of delivery:  
These have to be installed by the authorised electrician.
- c) Establishing the supply of electric current and carrying out the wiring unless expressly agreed otherwise:  
Electric input, 3 x 400 V, PE, N with fuses on control cabinet.  
Connecting cables between the control cabinet and the various motors and control units, connected on both ends so as to be ready for operation.
- d) Installation of the uninstalled water-bearing components included in the scope of delivery:  
Water-bearing components included in the scope of delivery not factory connected, such as pumps, valves, thermal run-off safety valves, accumulators, etc., must all be installed by the authorised heating engineer.
- e) Sealing all the openings between the burner room and the fuel storage space, doing so according to the fire prevention regulations.

**Installation (two KÖB fitters) [Art. No. IMO-2]**

Performance provided by the contractor (supplier):

Furnishing the entire scope of the delivery. Installing the burner system, incl. all the machinery parts and facility components contacted by fuel and exhaust gas for the scope of delivery cited. Also included is the installation of all the switches, probes and sensors supplied (exceptions: weather sensors and heat consumers).

The installation will be carried out by two experienced fitters.

Price, incl. travel, expenses and overnight accommodation.

Performance provided by the client (buyer):

1.) Prior to installation of the burner system

- a) Equipping of construction site as follows:  
Paved access road to the construction site;  
230-V current supply line and, if necessary, 400 V for electric installation tools (welding apparatus);
- b) General construction work, as follows:  
Making all the installation holes required for the installation;  
Making the cement foundations and recesses for refill access lids and casings of extraction equipment;  
Pits and breakthroughs for fuel conveying equipment
- c) Construction work in particular as follows:  
Hydraulic sliding bar extraction system:  
Moving and setting in concrete the securing brackets supplied (if included in the scope of the delivery);  
Making the securing brackets (if not in the scope of the delivery). Due to the great forces that develop, this performance should be furnished according to the instructions of an expert (architect or structural engineer) in accordance with the supplier's specifications;  
Making the chimney system with the connecting hole for the exhaust pipe (exception: metal chimney included in the scope of the delivery);
- d) Draining the heating room and silo room with all the ducts and shafts required for installing the entire facility.
- e) Unloading the scope of the delivery from the truck unless the delivery has been expressly agreed with a crane truck.

2.) After the installation of the burner system

- a) Installation of the control cabinets delivered and/or the central control modules  
Unless expressly agreed otherwise, these must be installed by the authorised electrician.
- b) Installation of weather sensor and probes for the heat consumers in the scope of delivery:  
These have to be installed by the authorised electrician.
- c) Establishing the supply of electric current and carrying out the wiring unless expressly agreed otherwise:  
Electric input, 3 x 400 V, PE, N with fuses on control cabinet.  
Connecting cables between the control cabinet and the various motors and control units, connected on both ends so as to be ready for operation.
- d) Installation of the uninstalled water-bearing components included in the scope of delivery:  
Water-bearing components included in the scope of delivery not factory connected, such as pumps, valves, thermal run-off safety valves, accumulators, etc., must all be installed by the authorised heating engineer.
- e) Sealing all the openings between the burner room and the fuel storage space, doing so according to the fire prevention regulations.

A prerequisite for approval is the express permission for such by the public authority responsible. For claims to the warranty according to Section 11 of our General Terms and Conditions of Delivery, wood fuels have to meet the following conditions. If those conditions are not met, then approval is possible with restrictions (warranty, maintenance, operational safety) with a written statement by the manufacturer in reference to the facility.

### 1) Non-combustible substances contained

No wood fuels may contain any foreign bodies, such as pieces of metal, stones, masonry remnants or plastics. Nor must the following limits (per kg of dry fuel) for non-combustible substances contained (ash analysed at a temperature of 815°C) be exceeded or fallen short of:

	Limit	Comparison with untreated forest wood
1.1) Chlorine Cl:	max. 300 mg/kg	10 mg/kg
1.2) Sulphur S:	max. 1000 mg/kg	120 mg/kg
1.3) Total Cl, S:	max. 1000 mg/kg	130 mg/kg
1.4) Ash content, total:	max. 15.0 g/kg	5.0 g/kg
1.5) Alkali oxides in the ash ( $K_2O$ and $Na_2O$ ):	max. 1.0 g/kg	0.35 g/kg
1.6) Sintering point of the ash:	min. 1000°C	approx. 1200°C

Consequence of substantial overstepping of limits (1.1, 1.2, 1.3, 1.5, 1.6):

- a) Hot-gas corrosion in the heat exchanger → Special maintenance instructions for heat exchanger  
→ Shortened service life of heat exchanger
- b) Early sintering and melting of the ash → Special maintenance instructions for firing,  
→ Increased maintenance costs (firing, boiler door)

If the maintenance instructions are not followed, a process will be created that builds up in a negative fashion with:  
→ Cinders change the airflow → Temperature peaks → more slag → etc, until there is fast destruction of the refractory materials

- 1.7) Additives in remnant and used wood: Free of heavy metals and halogen compounds

### 2) Superfines & dust (wood particles smaller than 1.0 mm as per ÖNORM M 7133)

- 2.1) Without pre-dryer, max. 10.0% of the total mass; consequence of substantial overstepping of limit:

Temperature peaks → Slag formation → Even higher temperature → etc, to the point of destruction;  
→ Special maintenance instructions for firing;

Elevated values are especially critical for remnant wood in combination with elevated values as per 1.1, 1.2

- 2.2) For forest wood chips with pre-dryer, max 4.0% of the total mass; consequence of substantial overstepping of limit:

→ Moving the exhaust air lines → Special maintenance instructions for cleaning exhaust air line

### 3) Origin and treatment

#### 3.1) Forest wood and plantation wood (complete trees and trunk wood untreated)

Mature wood from trunks and branches, untreated, chopped as billet wood or chips

#### 3.2) Compressed wood, pellets (conforming to standards, such as: ÖNORM M 7135)

Untreated wood with limited bark content, compressed by machine and calibrated

#### 3.2) Increased proportion of bark, tree cuttings from roadside trees (untreated)

Remnants from the forestry and sawmill industries or from conservation of the countryside (elevated ash content).

#### 3.3) Remnants from derived timber products

Usually a mixture of untreated and treated wood in the form of shavings from processing machinery and chips from choppers that run slowly. In cases of elevated proportions of dust and/or limited storage volumes, these shavings are compressed into briquettes.

#### 3.4) Used wood

This is essentially untreated wood that has been used prior to its energetic utilisation (e.g. pallets). It is reduced in size by shredders for thermal utilisation. The metal parts have to be removed afterwards (by magnetic separators).

### 4) Particle size: adjustment of the conveyor augers

#### 4.1) G30/G50 chips from untreated wood as per ÖNORM M 7133:

made by fast-running and cutting tools;

	max. coarse fraction	with cross-section	and length
G 30	of 20%	max. 3 cm <sup>2</sup>	max. 8.5 cm;
G 50	of 20%	max. 5 cm <sup>2</sup>	max. 12 cm;

Required cross-sections of the loading: depends on the boiler output:

		up to 150 kW	up to 500 kW	from 500 kW
Conveyor auger	D	min. 12 cm;	min. 15 cm;	min. 20 cm
Drop cross-section	A	min. 175 cm <sup>2</sup>	min. 300 cm <sup>2</sup>	min. 600 cm <sup>2</sup>

**4.2) Chips not from the forest; origin as per 3.2, 3.3, 3.4; briquettes, origin as per 3.3**

Size essentially as per ÖNORM M 7133 G50, additionally, however:

- Fraction of one-offs max. 5% with cross-section of max. 5 cm<sup>2</sup> up to a length of max. 16 cm
- Frayed surface by chopping tools (shredders) or slow-running choppers
- Briquettes, diameter max. D 60 mm (hydraulic compressors, pressure geared to loading system)  
Conveyor augers diameter min. 20 cm; drop-off route, rotary valve cross-section min. 600 cm<sup>2</sup>
- Consequence of overstepping particle size:
- Extra expenditures for correcting malfunctions
- Shortened service life of the conveyor augers and drives

**5) Bulk density S (kg/m<sup>3</sup>), water content W (%), size G (mm) as per ÖNORM M 7133**

In automatically loaded boiler plants, the wood fuels that come to be used should be individually listed in offers and orders as follows:

a)	S 130	W10 to W20	G30/50	Sawdust, untreated (planing shop)
b1)	S 200	W20 to W35	G30/50	Sawdust, untreated (sawmill)
b2)	S 200	W20	G30/50	Forest wood chips, soft, untreated
c1)	S 250	W20 to W35	G30/50	Forest wood chips, soft, untreated
c2)	S 250	W35 to W50	G30/50	Sawdust, untreated (sawmill)
d1)	S 300	W20 to W35	G30/50	Forest wood chips, soft/hard, untreated
d2)	S 300	W35 to W50	G30/50	Forest wood chips, soft, untreated
e1)	S 350	W20 to W35	G30/50	Forest wood chips, hard, untreated
e2)	S 350	W35 to W50	G30/50	Forest wood chips, soft/hard, untreated
e3)	S 350	W50 to W60	G30/50	Forest wood chips, soft, untreated
f1)	S 400	W35 to W50	G30/50	Forest wood chips, hard, untreated
f2)	S 400	W50 to W60	G30/50	Forest wood chips, soft/hard, untreated
g)	S 130	less than W15	G30/50	Shavings & chips from wood remnants, dry, mixed
h)	S 200	less than W15	G30/50	Shavings & chips from wood remnants, dry, mixed
i)	S 250	less than W15	G30/50	Shavings & chips from wood remnants, dry, mixed
j)	S 350	less than W15	G30/50	Briquettes from wood remnants D 40 to 60 mm
k1)	S 650	less than W10		Pellets conforming to standards, untreated D 6 to 10 mm
k2)	S 650	less than W10		Pellets conforming to standards, untreated D 11 to 15 mm

**6) Maximum water content allowed, W, (percentage by weight of the total mass)**

The maximum water content allowed in the fuel when entering the furnace should be taken from the spec sheets for the furnace series. With a pre-dryer installed between the furnace and the fuel storage site, extra water content can be in the fuel stored (see specifications in reference to the order). The water content influences the maximum furnace output possible, the heat emission required to the pre-dryer and thus the maximum heat emission possible to the consumers.

**7) Other information**

**7.1) Ash and cleaning**

Untreated wood without bark has a proportion of ash less than 0.5% of the fuel mass supplied. All the specifications regarding cleaning involved are based on untreated wood with bark attached with an ash amount of 0.8%. The cleaning and maintenance involved for other wood fuels should be adapted according to the amount, the specific weight and the behaviour of the ash.

**7.2) Changing fuels**

A great change in fuel quality, such as bulk density, water content, dust proportion or ash content might make a manual correction of the firing parameters necessary (see Operating Manual).

**8) Non-woody fuels from biomass**

Non-woody fuels from biomass, such as needles, foliage, grain, straw, fruit pits, etc, are usually unsuited as fuel for trouble-free operation and thus are not approved.

**9) Wood fuels: rules, regulations and standards**

Germany: 1<sup>st</sup> BImSchV<sup>1</sup> dated 14 Mar 97, amended on 2 Aug 2001; page: Fuels nos. 5 to 7

Austria: FAV dated 18 Nov 1997 "Feuerungsanlagenverordnung" (Furnaces Act § 3.(1) 3. Solid Fuels

Switzerland: Luftreinhalteverordnung LRV (Swiss Clean Air Act) dated 16 Dec 1985 (Standing: 28 Mar 2000)

DIN 51731 Compressed Wood from Untreated Wood (1993)

ÖNORM M 7135 Compressed Wood from Untreated Wood or Untreated Bark (1998)

ÖNORM M 7136 Wood Pellets, Quality Assurance, Transport Logistics and Storage Logistics

ÖNORM M 7133 Wood Chips for Energetic Purposes (1998)

EN 303-5 Heating Boilers for Solid Fuels, Table 8 "Test Fuels"

CEN/TS 14961 Solid Organic Fuels

<sup>1</sup> BImSchV = Bundes-Immissionsschutzverordnung [German Federal Emissions Control Act]



**1) Liability on Orders of Confirmation, Altering and Cancelling Orders**

- 1.1) If no other agreement exists, the confirmation of order determines the contents and the time of delivery. If the technical specifications of individual parts delivered are not restated in the confirmation of order, then the technical specifications stipulated in the last bid are valid.
- 1.2) Should in addition to the confirmation of order, the customer's order be valid, it is noted on the supplier's confirmation of order according to priority.
- 1.3) If within 10 days of sending the confirmation of order, no objection is raised, then the order is regarded as accepted. With terms of deliveries of less than 30 days, the window for objections is narrowed to 30% of the terms of delivery.
- 1.4) Altering and cancelling orders after the term of objection has expired, is only possible with the written consent of the supplier. Any additional cost is to the buyer's account.

**2) Prices**

- 2.1) The listed prices of the supplier (price lists) may be changed at any time without prior notice.
- 2.2) The listed prices of the supplier are ex-factory prices and do not include Value Added Taxes (VAT).

**3) Illustrations, Properties and Technical Terms**

All technical data, illustrations, measurements, diagrams and weights specified in bids, remain non-binding until they are part of a binding documentation delivered in connection with an order of confirmation. All rights for construction related changes remain reserved. Materials may be replaced by equivalent alternatives.

**4) Copyrights and Ownership of Technical Drawings and Documentations**

Technical drawings and documentation that are handed to the buyer but do not form an integral part of the equipment and its applications, remain the property of the supplier. Only with the written consent of the supplier, may documents be passed on to third parties in a changed form or in the original form.

**5) Copyrights and Ownership of Control Programs**

Control programs used to control the equipment remain the property of the supplier. With the full payment of the equipment, the buyer receives life-long, unrestricted user rights to the control programs.

**6) Terms of Delivery**

- 6.1) Agreed upon terms of delivery are binding.
- 6.2) Equipment related preparations of the delivery site must be made before delivery of the equipment. Clarifications on the dimensions of the site (to adapt mountings and fittings of the equipment to the site, the following minimum terms of delivery are required:  
42 days for systems with standard components  
70 days for portable building systems  
Multiple-boiler systems (complex large-scale systems) according to arrangement with the supplier.

Should it not be possible to make these preparations within the stated minimum terms and should the supplier not be at fault, then the supplier is relieved of all liabilities of the term of delivery.

- 6.3) The supplier reserves the rights to hold back on the delivery should the agreed terms of payment not be met by the buyer.
- 6.4) Should any additional cost arise due to the delay in delivery, a mutually acceptable settlement of the cost to the buyer should be negotiated between the contract partners.
- 6.5) Should ordered equipment not be accepted at the agreed term of delivery, the supplier has the right to invoice the equipment to the buyer. Any additional cost arising from storage should be negotiated and settled between the contract partners.
- 6.6) With on demand orders, the supplier reserves the right to only start with the production of the equipment after the receipt of the on demand order.

**7) Shipment /Transportation**

- 7.1) The supplier uses the type of packaging materials and means of transportation he deems suitable.
- 7.2) If no other agreement exists, the equipment is sold ex-factory. Furthermore, the INCOTERMS of the day of the contract signing is valid.
- 7.3) Should parts of the equipment be shipped individually at the buyer's request, then the additional cost will be to his account.

**8) Installations by the Supplier**

- 8.1) Has the mode of transportation and installation of the equipment been agreed upon, then the buyer is obligated to prepare the installation site on time and in the manner stipulated. These required preparations are listed in the confirmation of order under the position "Installation".
- 8.2) In general, a paved pathway suited for trucks that bring the equipment to the site must be prepared.
- 8.3) Furthermore, before installation starts, the masonry, carpentry and other preparatory work has to be moved along far enough so that upon delivery of the equipment, the installation technicians can take up their duties right away and carry them out without interruptions.
- 8.4) Should installation have to be interrupted due to lack of preparedness of masons, carpenters, etc. the buyer then must properly store the uninstalled equipment and protect it as if it was his own property

The cost arising from the delay and additional travel expenses of the installation technicians are to the buyer's account.

**9) Inspection/Complaints during Handover**

- 9.1) The buyer is obligated to inspect the goods immediately upon receipt.

Should the goods not correspond to the items on the delivery note, or in case of visible damage to the delivered goods, the buyer has to mark it on the delivery



note. His failing to do so, validates the shipment of the items delivered.

9.2) A complaint outside of the terms voids the supplier's warranty.

9.3) Should the buyer desire a handover inspection, he has to have a written agreement to that end and all additional cost is to his account.

Should the handover inspection for whatever reasons (that the supplier needs not stipulate), be delayed, then the specifications that are to be checked shall count as met until the opposite is proven.

Complaints do not void terms of payment.

**10) Complaints on goods where the damage was not discernable at delivery**

Complaints on goods where the damage was not discernable at delivery (analogue to the procedure in point 9), should be made as soon as detected, latest however before the warranty runs out according to point 11.

**11) Warranty/Starting Point and Duration**

The equipment can only function correctly within the warranty period, if the operational guidelines are adhered to.

The operational guidelines are an intrinsic part of the delivered equipment and essential to its correct operations.

The operational guidelines are:

- a) The operating manual with the instructions on operating the equipment.
- b) The specifications of compatible fuels for the burner. (Refer to 1010-1, minimum requirements on wood fuels, notices).
- c) The handover protocol with the installation report and the specifications of the fuel used at the point of handover.
- d) Maintenance and service plan.
- e) Fulfilling and adhering to the legal framework.

If these are maintained, the following warranty periods are valid:

**11.1) 5 years on seal warranty for burners and tanks**

Warranty on water tightness of water bearing, welded construction such as the burner, heat storage tank and utility water heater (electric heater not included), is 5 years as of date of delivery.

**11.2) 3 years on movable parts**

Warranty on the all movable parts, such as firebox door, fire-proof materials for coatings, grills, dedusters etc. is 3 years as of the date of delivery.

**11.3) 2 years electrical, motorized movable parts**

Warranty on all electrical parts, such as controls, controllers, sensors for drives and motorized movable parts such as drive motors, hydraulic units, hydraulic cylinders, pushrods, extraction and feed worm, sluice wheels, movable grills, valves, pumps, step down gearing, chain drives, blowers, fire protection door, motor covers etc. is 2 years as of the date of delivery.

**11.4) Normal Wear, Oils and Lubricants**

There is no warranty on parts subjected to normal wear such as seals, etc. Also oils and lubricants, such as hydraulic oils etc. carry no warranty. Normal wear is also present in the fireproof coatings (surface wear, wear around the edges, cracks etc) that do not lead to any malfunction of the equipment- are not covered by warranty.

New parts carry the stipulated new parts warranty. No warranty extension on original parts that had no complaints.

**12) Payment**

12.1) Payment is done in accordance with the terms of payment. It is not acceptable to withhold or suspend payment because of complaints, outstanding credit notes or not agreed upon charges to the account of the supplier.

12.2) The terms of payment must be adhered to, even if minor, non-essential parts are missing in the delivery or must be reworked after delivery, as long as they do not impair the operations of the equipment.

12.3) Should the buyer fall behind in the payment schedule or not live up to certain agreed upon stipulations,

- a) then the supplier may insist on the payment of the outstanding amount in rates or delay agreed services
- b) extend the terms of payment on the outstanding amount
- c) invoice the buyer with the entire outstanding amount for immediate settlement
- d) add the usual bank interest rates to the outstanding amount or step away from the contract after granting the buyer a reasonable period of respite.

**13) Liabilities**

The supplier is not liable to the buyer for any losses occurred due to interruptions in production, financial losses, missed opportunities, breakdowns, lost contracts or any other economical transaction or for any indirectly occurred losses.

**14) Limits of Liabilities**

Acts of God are unpredictable occurrences beyond the control of either party and may be the cause the contract not being partially nor totally fulfilled. Neither party is then liable for breach of contract.

Acts of God in this case are:

Fire, conscription, confiscation, embargos, prohibition of currency transfers, rebellion, unavailable means of transportation, general lack of supply goods, limits set to energy consumption, plane crash, volcanic eruption, earth quake, avalanche, landslides, hurricanes, tidal waves, etc.



## EC-Declaration of Conformity

### The PYROT rotary heating system (burners for solid fuels)

The models: Pyrot 100, Pyrot 150, Pyrot 220, Pyrot 300, Pyrot 400, Pyrot 540

were developed, constructed and manufactured solely by

**KÖB Holzfeuerungen GmbH**  
**Flotzbachstraße 33**  
**A-6922 Wolfurt**

**The PYROT rotary heating systems with solid fuel automatic feeder systems meet the requirements of the following guidelines:**

- ☐ 98/37/EC Machine guidelines
- ☐ 73/23/EWG Low voltage guidelines
- ☐ 89/336/EWG EMC guidelines

#### **Applied standards:**

- ☐ EN 303-5, DIN 4702  
Solid fuel burners, manual and automatic feeder systems.
- ☐ EN 60335-1 / A-14:98 Safety standards for appliances for household and similar purposes.
- ☐ EN50081 Part 1 and part 2, EN50082 part 1 and Part 2, EN55011, ENV50140, ENV50141, EN61000-4-2, EN61000-4-4, ENV50140, ENV50141 Electro magnetic compatibility.
- ☐ TRD 702

A complete technical documentation is included. The operation and installation manual is included in the language it was originally published in and in the language of the country to which it is delivered.

Wolfurt 25.09.2007  
Date

Signed

Ing. Siegfried Köb  
First name, Name

Manager  
Function

Leerseite für Notizen:

Blank page for notes:

Page en blanc pour des notations:



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